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VOL. I.

THE



NATURALISTS'

COMPANION,

EDITED AND PUBLISHED BY

CHARLES P. GUELF,

BROCKPORT, N. Y.

TO OUR READERS.

The editor, in order to obtain a large circulation for his COMPANION, offers the following inducement: To any person sending us 50 cents for one year's subscription to the COMPANION, and five cents extra to pay postage, we will send any one of the following specimens:

Calcite, Satin Spar, Fossil Crinoid Stems, Fossil Coral, House Canary's Egg, Egg of Purple Grackle, Egg of Barn Swallow or Fossil Shells.

To the person sending us the largest number of subscriptions before September 1, 1885, we will give the same prizes offered for the solution of the puzzle on page 14, besides their regular commission.

Our object in publishing this paper is to issue a Monthly on all the different branches of Natural History and to this end we desire all persons interested in the science to contribute liberally to these columns items on Geology, Mineralogy, Zoology, Entomology, Oology, Botany, Conchology, Astronomy, Taxidermy, Ornithology, or other articles relating to Natural History.

We will send the COMPANION one year to those who subscribe before August 10, 1885, on receipt of 40 cts.

We desire our readers to send us items about their collecting excursions or on any subject they think will be of interest to the readers.

CLUBBING.

To persons intending to solicit subscriptions for the COMPANION. We will allow you a cash commission of 20 cents for each subscriber

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CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, N. Y.

The cover on our next issue will be profusely illustrated with designs of animal and bird life, and will probably be printed on colored paper; If nothing intervenes, our next issue will be simply grand.

The oldest, and at the same time the thickest tree in the world, so far as is known, is a chestnut near the foot of Mount Etna. It is hollow, and large enough to admit two carriages driving abreast. The circumference of the main trunk is 212 feet.

Notice "Ancient Trees" on page 9.

A new fish, the cherna, belonging to the halibut family, has made its appearance in the Gulf of Mexico.

There is a bird roost at lake Gentry, in Brevard county, Fla., covering a tract of eighty acres, in which, it is estimated, over 7,000,000 birds gather every season. It has been a resting place from time immemorial.

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Read the above if you can!

The Naturalists' Companion.

Vol.1. Brockport, N.Y.



July, 1885. No. 1.

Published Monthly, 50c. per Annum.

The Study of Nature.

BY CHAS. D. PENDELL.

"To him, who, in the love of nature holds
Communion with her visible forms, she speaks
A various language; for his gayer hours
She has a voice of gladness, and a smile
And eloquence of beauty, as she glides
Into his dark musings, with a mild
And gentle sympathy that steals away
Their sharpness, ere he is aware."---BRYANT.

The study of nature thus aptly portrayed, is as vast, varied and inexhaustible at the present time as it was thousands of years ago. Indeed, the beauty and grandeur of nature's work was undreamed of by the ancients. Though the citidal of Athens, then, as now, looked upon the setting sun and her temples flamed in his refulgent beams, while the silvery clouds of the Aegean sea rolled around verdant isles and sported in the azure vault of heaven, no Grecian poet was ever inspired by the sight.

The placid waves of Italian lakes sparkled beneath a sunny sky, their waters laving the green shores that were teeming with the beauties and blessings of nature; yet the Romans saw them not. The stupendous grandeur of the Alps was to them only a barrier against conquest, or a wall of defence.

The study of nature has hardly begun, and yet its immensity seems astounding. Looking into the mineral kingdom we find many curious combinations and forms of the elements. In the black masses of coal

used in our furnaces and in the diamond, sparkling in the adornment of a society belle, we recognize the same substance—carbon—in widely different forms. Again, we see two minerals entirely different in composition very closely allied in appearance. We also observe that those minerals most useful to man present the least attractive appearance; while those intended for ornament and adornment are remarkable for their symmetrical crystalization, their lustrous hues and varied combination of colors. We pick up a rock and in it we see the fossil remains of a mollusk; but is that all? Far from it. That fossil has a history reaching back thousands—perhaps millions of years. It tells of a time when the place we now tread was a shoreless sea swarming with thousands of its kind, and prolific with strange and terrible monsters now extinct.

We dip our finger into stagnant water and, on removing it, find in the little still adhering thousands of animalcules in the full enjoyment of an active life. And in all the gradations of insect life, including over one hundred thousand species, we find a fascinating and inexhaustible field of research.

We turn our thoughts to a higher grade of animal life, and, gazing upon the mighty elephant, the lordly lion, the ferocious tiger, the stately elk; then the agile monkey, the timid hare or the cringing mouse, and in each we see the wise provisions of an omnipotent Creator.

Leaving the torpid python and the basking crocodile, we turn to the whale, the great leviathan of the deep; and, through all gradations of aquatic life to the smallest minnow, we perceive in each and every specimen something new—something to admire.

We look aloft and marvel at the swift flight of the swallow, the graceful undulations of the oriole, the easy movement of the hawk and the majestic poise of the eagle. And when we have beheld the varied and gorgeous plumage of the entire feathered race, ornithology will have made an impression on our minds never to be effaced.

Turning over another page on the book of nature we come to a science scarcely less interesting, certainly no less important,—botany. In the vegetable world it is that our physical needs are most bountifully supplied and our æsthetic taste most fully gratified. From this division of nature we principally derive our sustenance, construct our dwellings and manufacture our clothing. The earth would look dismal indeed were not the waving carpet of verdant grass spread o'er its broad landscape, its hillsides be decked with stately trees and the valleys perfumed with the odor of incense rising from the numberless sweet smelling flowers, bewildering the eye with their infinite variety and gorgeous array. The mind is lost in contemplation as it views, through the ever-changing kaleidoscope of nature, the long procession pass before it. The delicate fungi, the drooping sensitive plant, the modest violet, the blushing rose, the gigantic rafflesia give but a faint conception of the beauties and wonders of plant life.

But not until we soar out into worlds beyond our own does the immensity of creation dawn upon us. Great though our world is, it sinks into insignificance when compared to the worlds around us. While to us Jupiter is one of the brightest of the planets, our world is altogether invisible to Jupiter; which, in size, is equal to 1,300 such worlds as this. And, though the great center of our solar system, if divided, would form no less than 1,384,000 globes the size of the earth, there are, in the great beyond, suns proportionally larger than our great luminary. But our earth is large enough for our requirements. Let us study the manifold manifestations of our beneficent Creator and we will find much remains to be unfolded; and in our researches in nature's great laboratory, we will derive much pleasure and constantly be adding to our acquirement of knowledge.

Plumage of Birds.

PAPER BY H. L. WARD—OBJECT OF FEATHERS—MOULTING SEASON.

At the board of education rooms, Rochester; N. Y., Henry L. Ward recently read a paper on "Feathers," before the Society of Natural Sciences. A number of stuffed birds were used in illustrating the points made by the speaker. After dwelling in detail on the structure of feathers Mr. Ward said:

"Connected with the growth of the feather are the moults, and in these we find many curious facts. Probably all birds acquire a change

of plumage at least once a year. This general widespread moult takes place after the breeding season, when the feathers most need a change, because of the wearing and soiling incident upon incubation. With most birds, at this time, all, or nearly all the feathers are shed and new ones take their place. This does not happen to the powder down which is never moulted. This change is usually so gradual that seldom does a bird lose the power of flight. However, this does happen to some of the ducks. This change, though gradual, is yet so rapid that the drain upon the delicate systems of the birds is very evident. Then it is that one sees the robins and other familiar birds skulking around the hedge rows and fence corners, evidently in distress and loath to take wing at alarms which at other times would occasion instant flight. The very marked decrease of song also plainly tells of the depressed spirits of the birds. This unwelcome change of toilet falls as well on the young of the year as upon the adults, and one can hardly conceive of a more woe begone specimen of bird life than is presented by one of these awkward, overgrown youngsters who for a second time in the same year have to pass through tortures to which the tooth cutting of children probably bears little comparison. As birds are the most æsthetic of animals in their natural state, not excepting man, it is not surprising to find that they take great pride in their beautiful feathers, and that this should result in some marked change at certain periods? When the male bird goes forth to seek a mate it is but natural that he should desire to present the finest possible appear-

ance. This desire finds embodiment in many curious appendages such as wattles, various brightly colored excrescences upon the body, etc., which appear at this season and lasts for but a short time. These have there compliment in the crests and dorsal plumes of the herons and egrets, the ruff of the European Ruff, *MACHETES PUGNAX*, the long tail feathers of the widow bird of Natal, and others which appear just previous to the breeding season and shed previous to the general fall moult. Their use in attracting the female must be very great for they are of much disadvantage to the bird in other ways, seriously impeding his flight and by rendering it more conspicuous it is much more liable to fall a prey to other birds. Many birds are of entirely different color during the winter than in the summer. The most obvious mode of effecting this change is at the annual fall moult. To regain their summer dress it is evident that there must be a second moult. This takes place in the spring.

Primarily the object of feathers is to furnish protection to the body. Birds are the warmest blooded vertebrates and very sensitively organized; yet in a few seconds they change from the arctic cold of immense altitudes to the burning sands of torrid deserts. Secondly, feathers are for flight, and how well they serve their purpose in this particular is apparent when one recollects that a frightened duck will often fly a mile in thirty seconds; that an eagle will circle from the earth until lost to sight with no preceptible motion of his wings. Thirdly, they are of use as a protection from sight. The woodcock is almost absolutely invisible in its surroundings. Fourthly, they serve as limbs. The tail of the chimney swallow is a familiar example; also the creepers and woodpeckers. The fifth use we may consider to be the attraction of the opposite sex."—*Herald*.

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A MONTHLY PUBLISHED IN
THE INTEREST OF NATURAL
HISTORY.

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—BY—

CHARLES P. GUELF,

BROCKPORT,

N. Y.

We request all of our readers to send us a description of their collecting Excursions, their Finds, or any Items they may think will be of interest to the readers of the COMPANION.

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RANDOM NOTES.

The snowfall on the Italian Alps last winter was the heaviest within the memory of man.

A pair of locked deer-antlers were found in the Cœur d'Alene Mountains some time ago. The ground gave evidence of there having been a terrible struggle between the animals to whom they belonged.

It is our intention to make this paper one of the leading journals on natural history, and to do so we must use illustrations. Now if our readers will work faithfully between this and our next issue and secure a reasonable number of subscriptions for the COMPANION, our next issue will appear finely illustrated. It is our intention also to enlarge the paper as soon as we receive a sufficient number of subscriptions.

Prof. Dana says in his “New Text Book of Geology,” that the field geologist should know accurately the measurements of his body; his height, length of limbs, step or pace, that he may use himself whenever needed as a measuring-rod. Will man be convert next into a shot-gun or a telescope?

The *Railway Herald* says that a valuable mica mine has recently been discovered about fifty miles from Cheyenne. Large sheets of mica, clear as glass, are found in large quantities.

Our readers should bear in mind that they have the free use of our question and exchange columns. Items on natural history will be thankfully received at all times. Of course we will reserve the right to publish only those which will meet with the most approval.

In looking over our collection this spring we found a number of birds' nests which were in poor condition, among them the nest of a chipping sparrow which we threw out of the window, the nest falling in a goose-berry bush. About a week afterward we passed by the bush, and, glancing in the nearly destroyed nest, we beheld the egg of the cowbird. Has any one heard of such an occurrence before?

USEFULNESS OF DRAGON-FLIES.—The much-abused dragon-flies are perfectly harmless to human beings; they neither bite nor sting, but destroy vast quantities of gnats, flies, and other insects. They can be brought into the house to catch flies and gnats, which duty they perform if unmolested. While in the larva state they perform the same good work.

A magnesian limestone found at the entrance of the Tyne, in England, is reported to be so flexible that thin layers three feet or more in length may be bent in a circle while damp, retaining that form on becoming dry.

The Taylor museum, is a magnificent collection, much admired by foreign scientists, and much sought after by other institutions, and rich in the mineralogy and paleontology of the United States, and of foreign countries, including Italy and Ireland. This collection is the magnificent gift of Dr. Julius S. Taylor, of Kankakee, Ill., and is the result of much labor and expense during more than forty years. Dr. Taylor has been appointed director of the museum, and is now giving a large share of his time in putting up and arranging this vast collection, which the friends of Blackburn University are invited to examine.—LOCAL.

Lesson in Natural History.—Said a Fifth avenue four-year old maiden: "Do the geese lay the gooseberries?"

"Oh, no, my child; they grow on the trees."

"Well, what are goose eggs anyhow?"

"They are the things, my dear, which the base-ball players make when they don't make anything."

Mount Kosciusco, 7,171 feet high, was hitherto considered the highest peak of the Australian Alps. Dr. Lendenfeld has recently discovered another higher mountain which he named Mount Clarke, and which he found to be 7,256 feet high. The upper limit of trees upon it is 5,900 feet. Above 6,500 feet patches of snow are formed on the lee side of the mountain range.

Our readers may think this issue rather dry; the reason is that we have not had time to solicit items from our correspondents. This will not occur again if our readers will be prompt with their items.

The president of the London Zoological Society, Prof. W. H. Fowler, says on the origin of whales: "The evidence is absolutely conclusive that they were not originally aquatic, but sprang from land mammals of the placental division, animals with hairy covering and with sense organs, especially that of smell, adapted for living on land; animals, moreover, with four completely developed pairs of limbs on the type of higher vertebrates, and not that of fishes.

In a lecture at the Lowell Institute, Boston, Professor Wood gave some very interesting details regarding the phenomena of spider life. The female is much larger and fiercer than the male, who while paying addresses is constantly in a state of danger. Three different kinds of thread are spun by spiders for their webs. A scientific experimenter once drew 8,480 yards of thread or spider silk from the body of a single spider. Silk may be woven of a spider's thread which is more glossy and brilliant than that of a silkworm.

We can furnish data blanks, three by four inches in size, to collectors for 25 cents per hundred, or a smaller size at 15 cents.

The brilliancy in the eyes of cats is caused by a carpet of glittering fibers called the tapeum, which lies behind the retina, and is a powerful reflector. In perfect darkness, no light is observed in their eyes,—a fact which has been established by very careful experiments. Nevertheless, a very small amount of light is sufficient to produce the luminous appearance in them.

A new and curious plant has recently been discovered which is described as the traveling plant. It is stated to be of the lily-of-the-valley species, and has a root formed of knots, by which it annually advances about an inch distant from the place where it was first rooted. Every year another knot is added, which drags the plant farther on, so that in twenty years' time the plant has traveled about twenty inches from its original place.—GOLDEN DAYS.


A miniature gold mine was recently discovered on the teeth of a bullock killed near San Francisco. The jaws, with the teeth attached, were boiled, and when exposed to view the entire row of teeth was found to be thickly covered with pure gold, and considerable gold was also found in the pot in which the head was boiled. The coating was submitted to a chemical test, and was found pure. It is supposed that the animal must have drank from some stream abounding with the precious metal, which became attached, grain by grain, to the animal's teeth.

Subscribe for the NATURALISTS' COMPANION, only 50 cents per year.

A complete collection of the native woods of the United States is being prepared for the New York Museum of Natural History. It will comprise 26 varieties of oak, 34 of pine, 9 of fir, 5 of spruce, 4 of hemlock, 12 of ash, 3 of hickory, 18 of willow, 3 of cherry, 9 of poplar, 4 of maple, 2 of persimmon and 3 of cedar. Each specimen will display both longitudinal and traverse grainings of the wood, as well as the log in its natural condition, with the bark attached.

Mr. S. R. Canestrini has found that butterflies may use their wings eighteen days after being beheaded, crickets may leap on the thirteenth day after their heads have been cut off, and signs of life may be given by the body of the preying mantilla on the fourteenth day after decapitation. This experimenter has made still more striking observations which tends to prove that the head in insects has much less to do with guiding the motions of the body than the head in mammals.

If any of our readers desire any articles, whether specimens of natural history or otherwise, including pistols, shot-guns, balloons, sail or row boats, microscopes, telescopes, batteries, printing presses, type, or any other articles he or she may desire, all it is necessary for them to do will be to write us, stating exactly the article desired, and we will state the lowest possible figure they can be procured at. Therefore, dealers, please send in your circulars.

 WE WISH TO EXCHANGE papers with publishers in all parts of the world.

Please notice the ad. of "THE COLLECTOR" in another column.

A Remarkable Insect.

Prof. A. J. Cook, of the Michigan Agricultural College, says: A Texas correspondent complained some time ago of a bee-killer that "steals up to the entrance of the hives and picks up his bee, steps back, sucks the blood from his victim, and then proceeds as before." He further says that this is a bad thief. This insect is *PRIONOTUS NOVENARIUS* of Say. Its common name is wheel-bug, so called from the crested thorax which looks not unlike a half cog wheel. The bug sent me was one and one-half inches long, the ground work of the body dark, almost black, while the head, thorax, basal half of the wings, and broad rings on the dorsal surface of the abdomen seem powdered with white, caused by the presence of short hairs of that color. This white color beneath is even more marked.

The rapacity of this species is truly wonderful. Almost any insect which is put into a box containing it falls at once a prey to its savage ferocity. It is very interesting to see it grasp and dispatch even large bees and beetles that are put into a box where it is confined. Indeed, such is the strength of its beak that it can make quite a painful wound if permitted to pierce our own flesh. It is strange that it can grasp and kill bees with impunity. Kirby & Spencer, in their "Introduction to Entomology," report that this insect can and will produce quite a severe electric shock, if taken hold of. They also report that it leaves the print of all of its feet. If this be true, then this may be the reason that it can grasp the bees with no harm to itself.

This insect, as one of our most predacious species, is a great aid in the destruction of our injurious insects. It is to be regretted that it adds to its good qualities the evil one of destroying our bees. If, however, it only does its evil work about the hives and does not preform its captures on the flower stocks, where it may lie in wait to grasp the bee as it comes to sip the nectar, then we may capture the bugs and stop their mischief. I fear, though, from the habits of the family, that it may do as much harm in the field as at the hive. In this case it would be difficult to suggest any practical remedy—EXCHANGE.

We would like very much to add a specimen of the above mentioned insect to our collection. Collectors having one, in first-class condition, for sale or exchange, will please notify us.—[Ed.]

ANCIENT TREES.

Trees have been found in Africa which were computed to be 5,150 years old, and a cypress in Mexico is said to have reached a still greater age. The oldest individual specimen of any species—in fact the oldest living thing upon the globe—is probably the cypress of Santa Maria del Tule, in the Mexican State of Oaxaca. If estimates of tree ages are to be relied upon, the life of this venerable forest monarch may have spanned the whole period of written history. At last accounts it was still growing, and in 1851, when Humboldt saw it, it measured forty-two feet in diameter, 146 in circumference, and 382 feet between the extremities of two opposite branches.

TAXIDERM.Y.

A serial on preparing and preserving
animals, birds, reptiles, insects, etc.

QUADRUPEDS.



SCALPEL OR CUTTING KNIFE.

The above cut is intended to give the reader some idea of the shape of the scalpel. A very good scalpel may be made by breaking the blade of a jack-knife about 1 1-2 inches from the handle, filing the blade in the shape shown above.

WHEN a quadruped is killed, and its skin intended for stuffing, the animal is layed on its back, plug up its mouth, nostrils, and any wounds it may have received, with cotton or tow to prevent the blood from soiling the skin. An incision is made between the fore-legs and continued in as straight a line as possible until between the hind-legs. In this operation the incision should be made just deep enough to cut the skin, and the hairs should be parted as the incision is made, and none of them cut if possible. The next operation is to separate the skin from the trunk, which is easily done by inserting the handle of the scalpel between them, assisted occasionally by the blade. After the skin has been removed in every direction as far as possible without stretching it, a plentiful supply of flour is dusted over the meat to keep the fur from adhering, and each of the thighs removed by separating them at their junction with the pelvis, that is, by the head or ball of the thigh-bone. That part of the bone still attached to the skin should be drawn out as far

as the foot, and cleaned of all fleshy matter, and after powdered with flour returned to its place in the skin. The tail is then severed as close to the trunk as possible. The skin is separated from the back, as far up as the shoulders, by inserting the handle of the scalpel between the skin and body. The whole hinder parts of the animal being thus out of the skin, the next operation is to remove the fore-legs, by separating them from the body at the shoulder-joint. When the joint of one shoulder has been separated from the trunk, the flesh is removed from the leg-bones, and the bone again inserted in the skin, repeating the operation on the other limb, which is also returned. The skin is then drawn over the neck and head with the aid of the scalpel just far enough to admit the removal of the eyes; while great care must be taken not to injure the eyelids or stretch the skin, and to cut the ears as close to the skull as possible.

All this having been done, the head and trunk of the animal is completely separated from the skin. The neck is next severed close to the skull. The fleshy matter is then removed as much as possible from the head and face by the use of the scalpel; and a hole should also be made in the back of the skull and the eyes and brains carefully removed, and arsenic or arsenical soap inserted. The tail is removed by pulling the tail-bone gently, but firmly forward until the fifth joint is reached, then insert a cleft stick between the bone and skin, forcing it until the extremity of the tail is reached, then the bone will easily come out of the enveloping skin or sheath.

Now you are prepared to commence the no less tedious operation of stuffing; but before you attempt this practice skinning three or four animals until you can skin one without cutting or soiling the skin. Do not get discouraged at your many failures, but have patience and you will surely succeed in the end.

TO BE CONTINUED.

Fictitious Snakes.

Reem, who has charge of the reptile specimens in the Smithsonian Institute, contradicts much of the popular belief as to snakes. Some of the most dreaded have no existence.

The hoop snake, which takes the end of its tail in its mouth, and rolls over and over like a hoop, killing everything it touches with its venom, and the blow-snake, the breath of which is deadly, are fictions. As serpents move about, they are constantly feeling ahead with the tongue and the forward thrust and peculiar forked appearance of this organ has given rise to the false idea that with it the stinging is done.

In North America there are but three species of poisonous snakes—the rattlesnake, the copperhead or moccasin, and the coral. There are about thirty varieties of these species altogether. The copperhead is probably the most dangerous, as it is vicious, and never gives warning of any kind before striking. The rattle snake, though more poisonous than either of the others, will rattle at the approach of anything, and will try to get away unless brought to bay. The coral is much smaller, and is a native of the Southern States.—
GOLDEN DAYS.

Specific Gravity of Minerals.

Having had numerous inquiries as to how the specific gravity of minerals is ascertained, we copy the following from "Accum's Analysis of Minerals."—[Ed.]

Let a piece of the mineral, freed from its matrix as much as possible, be suspended by a horse hair or thread of silk from the scale of a fine balance, weigh it in the air, and mark down its weight. Let it next, still suspended from the balance, be immersed in a glass of water, and ascertain how much it loses of its first weight in air, how much weight is necessary to bring the scale to an equilibrium when the substance is suspended in water. Having done this let the sum of the weight in air be divided by the weight which the body lost during its immersion in the water, the quotient will then show the specific gravity of the mineral, for instance: suppose a piece of mineral weighs in air 360 grains; but when immersed in water loses 60 grains, the specific gravity of that mineral will be 6, for 360 divided by 60, is equal to 6, that is to say the mineral is 6 times heavier than water. It therefore contains metal and it consequently belongs to that class of minerals called ores.

The three great coal fields of Alabama are the Warrior, the Cahaba and the Coosa. The principal of these is the Warrior, which extends over somewhat less than 5,000 square miles. The entire strata covers an area of about 6,000 square miles.


Reader, do you not think this paper worth fifty cents per year.

Nature's Zoological Garden.

Dr. Felix L. Oswald says in the Cincinnati Enquirer: Sumatra is just four times as large as the State of Ohio, and the partial explorations of the west coast prove that it contains twice as many different birds and beasts as any other part of Southern Asia. There are elephants in Ceylon, but neither tigers nor orangoutangs; in Borneo there are oranges, but no elephants; in Java wild cows, but no larger apes, no crocodiles or rhinoceros. Sumatra has them all, and, beside, a flying night monkey (the winged lemur), several species of gigantic frugivorous, bats, and two varieties of Gibbon apes, creatures whose long arms and acrobatic talents make their capture so difficult that they are rarely seen outside of their native forests. The jungles swarm with pheasants and tropical pigeons, and the mountains with deer, wild goats and panther cats. As a hunting ground for naturalists, Sumatra would surpass Brazil about as much as Brazil surpasses the sandy pine forests of North Carolina, where only the drum of an occasional woodpecker breaks the wide spread silence. In fifty years from now, when the United States will have a hundred zoological gardens and as many first-class museums, their zoological supply-station will probably be the city of Palembang, in Southern Sumatra. Siamang apes can be bought there for ten guilders (about \$4.50); wanderoos, or long-maned baboons, with black heads and white hands, for six guilders; plebian monkeys for a

guilder apiece. The naturalist, Bottger, who visited the place in the interest of an Austrian scientific association, had an interview with a hunter who offered to catch three young oranges in as many days. The old ones are rather hard to get.

THE WORM'S HOUSE.—Their holes are often dug three or four feet deep, or in cold countries as much as seven or eight feet under the surface. These holes go straight down or in a slightly slanting direction. At the bottom there is a small round room, with perhaps a few little stones in it, for the worms do not like to lie close against the cold earth. During hot, dry summer weather, or in the cold frost of winter, the worms remain down at the bottom of their holes, curled up singly, or three or four may be rolled up in a ball together. The whole length of the narrow hole has a lining of dark mould. Near the top, for a few inches, the lining is made of leaves flattened and pasted all around against the earth. In that softly lined part the worm likes to lie all day in damp or cold weather, with his head just concealed beneath the level of the ground, or poking up from the surface. Through this habit of lying at the top of their little homes, with their heads stuck out at the door, they are easily caught and pulled up by the bird.

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If you should receive more than one copy of this paper, please hand one to your friend.

Five Car Loads of Relics.

Col. Stevenson, of the Bureau of Ethnology, Washington, who has recently spent several months in the west, has brought back the largest and most diverse collection of objects illustrating the home life, industries and religious customs of the Pueblo Indians ever made. In addition to the articles in this collection (which amount to five car loads, and consist of pottery, wollen fabrics, weapons and stone implements), photographs and colored sketches were secured in great number illustrating the dances, altar scenes, games and burial customs of the Pueblos. Many curious cave shrines never before visited by white men were explored, places to which for centuries the Zunis have been in the habit of making their annual pilgrimages with great ceremony to deposit idols, plume sticks and the skulls and bones of sacred animals. A pack train party visited, under the guidance of Zunian priests, a curious salt lake, seventy-five miles south of the Pueblo, whence the supply of salt used by the tribe is obtained, and from this point the travellers rode 150 miles west to a lake where, according to Zunian belief, the departed spirits of the Pueblos are all transported. To the later place guides could not be induced to go, though they pointed it out from a distance. The lake, which is but a few hundred yards in diameter, is surrounded by curious conical hills, formed by the deposit of matter from innumerable springs. The springs are now dry, except such as are beneath the surface of the water, but

some of the cones have open caverns into which one can penetrate by covered way two or three hundred feet.—NEW YORK HERALD.

EXCHANGES.

THIS column is open to all subscribers who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.


CHAS. P. GUELF, Brockport, N. Y., a self-inking, foot power printing press, chase 8 x 12, 4 Vols. "Golden Days" and a story book, for the best offer of a yacht, sails and all complete.

A. G. KING, Brockport, N. Y., a collection of 200 fine minerals, for a light, finely mounted sabre or sword.

WHITE DEER in the ADIRONDACKS.

JOHNSTOWN LETTER to the ALBANY JOURNAL.

An old guide from the lake Pleasant country reached here this morning. He reports that during the past few days three white deer have been captured alive in that section. Two of these, a large doe and fawn, were extracted from the deep snow, near Piseco lake, by William Courtney, an old huntsman of the vicinity. The other animal, an adult specimen, was captured in the same manner on the following day, by a brother of Courtney. The fawn has since died, but the other two are doing well. They are on exhibition, and awaken considerable interest on the part of the guides and hunters, who claim they are the only white deer ever known in that country.

 Subscribe for the NATURALISTS' COMPANION.

Wake Up, Collectors !!

In order to increase our subscription list, we make the following offer: To the person sending in the first correct answer to the following puzzle, with 50 cents additional for one year's subscription to the "NATURALISTS' COMPANION, we will send any of the following books free of charge: Dana's Text-book of Geology, Blowpipe Analysis, Wood's Natural History, or both Accum's Analysis of Minerals and Haney's Taxidermist's Manual.

By saying the first correct answer sent in, we do not mean the first one received by us; but the first correct answer mailed to us, which we shall decide by the post-mark. In answering this puzzle the answer must be the name of the articles, before they were beheaded.

PUZZLE.

1. Behead a bird and leave a sick deer.
2. Behead a bird and leave 1-12 of a foot.
3. Behead a bird and leave the means of propelling a boat.
4. Behead a mollusk and leave an article used by carpenters.
5. Behead an animal and leave an article used in printing.
6. Behead the fruit of the oak and leave a kind of grain.
7. Behead a fish and leave to listen or hear.
8. Behead a fish and leave the one of cards or dice.
9. Behead an insect and leave a disease of children.
10. Behead an ore and leave it the opposite of young.

11. Behead a fish and leave the nave of a wheel
12. Behead a grain and leave frozen water.
13. Behead a bird and leave a covering for the head.
14. Behead a bird and leave a worshiper.
15. Behead a bird and leave disorder.
16. Behead a fish and leave healthy.
17. Behead a fish and leave an animal of burden.
18. Behead a rock and leave accent.
19. Behead a bird and leave extravagant language
20. Behead a bird and leave one of a pale and sickly hue.

As some of our readers may not understand this beheading, we will state that to behead is to take away the first letter. For instance: behead Bruin, and it will leave ruin.

A Remarkable Block of Amber.

Some fishermen have fished up, opposite Stralsund, a piece of amber weighing more than eight pounds. It is $9\frac{1}{2}$ inches long, and $5\frac{1}{2}$ inches in circumference. It is a most remarkable piece of amber, having all the qualities which distinguish the rarest pieces—color dark yellow, shining like glass, and not transparent. It is rare that a piece of amber weighs a pound. The piece which is preserved in the museum at Berlin weight about fourteen pounds.

Boys and Girls, if you wish the best story paper published, send for the GOLDEN DAYS, published by James Elverson, Philadelphia, Pa. Only \$3.00 per year.

Column of Inquiry

This Column is open free to yearly subscribers only.

M. J. D., Atlanta, Ga.—Molasses and rum will make a very good sugar for moths; or where rum can not be had vinegar or beer will answer the purpose very well. Evening.

J. B. A., St. Paul, Minn.—The egg of the Cedar Wax-wing is generally of a slate color tinged with olive, and marked with dark brown and purple. Nest in trees. Now.

C. W. D., Boston, Mass.—I wish to know what becomes of the dirt removed by the ground-squirrel when making its nest. Natural history reference books fail to enlighten me on the subject. Will some of our readers inform him through this column.

P. C. H., New York city.—You should have a copy of "Davie's Egg Check List of N. A. Birds," we will furnish you with a copy for 60 cents.

F. F. D., Kalamazoo, Mich.—Should judge from description that No. 1 was American Raven, No. 2 Smith's Longspur, and No. 3 Least Tit. We are not positive of date.

R. O. S., Rochester, N. Y.—Yes, robins sometimes build their nests on the ground, but not very often.

E. H. T., Hartford, Conn.—The nest and eggs found by your are of the Baltimore Oriole. To late now.

—→←—
This, our first issue, is not up to the standard, but we will make it up on our next number, which will be simply excellent.

Remember, reader, that this is the last copy you will receive until you have sent in your subscription.

BIRDS' EGGS, ETC.

Send stamp for new list of Birds' Eggs, Minerals, Etc.

GEORGE F. GUELF,
Brockport, N. Y.

THE COLLECTOR.

This is a monthly devoted to the interest of collectors of stamps, coins, etc., also to dealers. Subscription 25 cts. per year.

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1 inch, 20 cents, 1 page, \$2.00. Ads. must be in by the 15 of the month to insure insertion in the NEXT NUMBER.

REMIT BY BANK OR POSTAL NOTE.

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Philatelic and amateur papers inserting the above will receive same space in "The Collector."

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CHARLES P. GUELF,
E. Thompson Camp, No. 30, S. of V.
Brockport, N. Y.

Editors.

When this space is stamped in red with the word "EXCHANGE," it indicates that we wish to exchange papers with you.

ADVERTISEMENTS.

In answering advertisements, always mention this paper.

PAPERS.

Brief notices of Papers, not to exceed three lines, inserted in this column at \$1.00 a year.

The Naturalists' Companion, a 16 page monthly, published by C. P. Gueff, Brockport, N. Y.

Printing.

It will pay all business men, agents and collectors to send their Job Printing to us. Satisfaction guaranteed.

Data blanks, 15 and 25 cents per 100.
 Letter heads, - \$2.50 per 1000
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Other work varies according to the amount of type-setting required. We do all kinds of job work. Send in your copy and we will state our lowest price. We are now prepared to furnish the public with the following Society Address Cards, which can be had at four different prices, according to quality and style.

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The emblems of the different societies is worked in colors on the cards. We have cards for the following societies at the above prices:

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We have cards for all Firecompanys.

THE NATURALISTS' COMPANION.

A sixteen-page monthly published in the interest of Natural History and all of its branches. Subscription price, only 50 cts. a year. Send stamp for sample copy. Remit by postal note. No stamps taken.

CHARLES P. GUEFF,

Editor and Proprietor,

BROCKPORT, N. Y.

EDITORS: insert the above ad. once in your paper and send us a marked copy containing the same and we will insert an ad. of equal size for you.

For Sale!

For sale cheap, a self-inking foot power Printing Press, chase 8x12. This press is in good condition and prints a sheet the size of one of these pages very nicely. Price \$20.00.

CHARLES P. GUEFF,

BROCKPORT, N. Y.

The Naturalists' Companion

Vol. 1.

BROCKPORT, N. Y., AUGUST, 1885.

No. 2.

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THE SKUNK.

The Skunk and Polecat are supposed by a great many to be the same. The reason of this is because they both have a strong stench or odor somewhat alike, the only difference being that the odor of the Polecat may be washed out while that of the Skunk never can. They both inhabit the New England states.

The Polecat, commonly called Mink, is amphibious, frequenting streams, rivers and lakes. It is longer than the Skunk and more slender like the weasel, being larger than a large cat.

The Skunk is a digitigrade, that is, it walks on its toes like the cat and dog, carnivorous animal, living chiefly upon flesh and blood, such as young poultry, eggs, crickets, and the roots of certain sweet grasses.

They live in deserted woodchuck's holes, and it is said that they will even fight the woodchucks out of their homes and then take possession of them. They rarely ever take up their abode in the open fields, but live in the woods, under fences and in barns, in the latter place they burrow under the floor and stone walls, steal whole nests full of eggs, killing poultry and doing a considerable mischief.

The Skunk is nocturnal, coming from its burrow mostly in the night. It especially prefers a moonlight night, and this is the time that hunters generally hunt them; although I

have heard an old darkey say that no old skunk would come out on a light night.

Some evenings they may be seen running along on the tops of fences or digging on the hillsides for food.

Their odor is not noticeable until they are caught or disturbed, when in defence they eject, from some anal glands located under the tail, a few drops of a yellow liquid in quick succession, which is so strong that it can be smelt one-half of a mile or over, and so penetratable that it can not be washed from clothes. The only way in which to cleanse them being to have them buried in the earth. This liquid contains valuable medical powers, but its extremely offensive odor interferes with its use. If it enters a dog's eyes it will put them out.

In size the skunk is nearly double that of the woodchuck. *

In front the skunk is armed with a row of sharp teeth like the cats, and on each foot with six sharp claws, two more than the cat has. They have small head and eyes, something between the weasel and otter. Its color is black and white and some are marked quite prettily. It has a large bushy tail, and is covered all over with long, soft and silky fur. This fur is quite valuable, forming an article of commerce in the fur trade, a large black skin bringing from 75 cents to \$1.75 raw from the trapper.

A fat skunk yields over a quart of oil, which is used by the doctors as

a medicine in cases of croup, coughs and hoarseness, and brings \$1.00 a pint or \$2.00 quart.

The seasons in which the skunks are caught and hunted and when their fur and oil is good, are fall, winter and spring.

The indian name for skunk is See-cawk.

L. A. WELLES.

* The writer has made an error in the above when he states that a skunk is double the size of a woodchuck. We have seen numbers of skunks, and not one of they was larger than a woodchuck and some not as large.—[Ed.]

CONTRIBUTIONS.

Mattie C. Garrett, of Steubenville, Ohio, has our thanks for the following interesting sketches:

The smallest bird of America is the Humming bird, of Europe the Golden-crested wren. The smallest quadruped is the Pigmy mouse of Siberia. One of the most diminutive plants is the Arctic raspberry, which is so small that a six-ounce vial will hold the whole plant, branches, leaves and all.

A hollow tree in southern California has been made into a dwelling. Doors and windows have been put in and floors built for eight stories, the entrance being by means of a ladder. Outside the topmost room is a small balcony, shaded by the foliage of the tree.

Poisoned by Bind-Weed.

Mr Robinson Warren, of North River, Prince Edward's Island, was recently severely poisoned by gather-

ing the flowers of *CALYSTEGA SEPIUM*. His body swelled, especially in the extremities, suffering much pain, heat, and irritation. Ultimately the skin peeled off, as if from scalding. His case is singular as people constantly handle the large showy flowers of this plant without any disagreeable results. It shows, however, how the acrid principle which resides in this family may sometimes operate. F. BAIN.

TAXIDERMY.

A serial on preparing and preserving animals, birds, reptiles, insects, etc.

PART 2—QUADRUPEDS.

STUFFING.

The animal having been skinned, we shall prepare for the operation of stuffing. Let us suppose the animal we intend stuffing to be a cat. Wire should be chosen of a thickness that will support the animal intended to be stuffed. One piece of the wire is cut the length of the cat, from the top of the head to two inches beyond the end of the tail. A piece of wire is also cut for the fore-legs of a length which will reach from the tip of one foot, across the body, to three inches beyond the tip of the opposite foot. Wire being measured and cut in like manner for the hind-legs. A quantity of tow or cotton is procured, or when these cannot be obtained, old roap teased down will make a very good substitute.

The hole in the back of the head from which the brains were removed should be stuffed with tow, and also all places from which any flesh was taken should be replaced with

tow or cotton, in proportion to the amount removed, and a quantity of either placed along the back inside the skin, filling the skin about half full. The piece of wire cut the length of the animal is now filed to a sharp point at both ends, and two loops made in it; one made so as to come between the fore-legs and the other so as to come between the hind-legs. These loops are intended to pass the leg-wires through, they should be made just large enough to pass the wire through twice. The wire is now pushed up through the neck, through the skull, and out at the top of the head, just above the eyes, the other end of the wire is pushed down to the extremity of the tail. The two remaining wires are each filed to a point, and the one measured for the fore-legs is inserted in the palm of one of the fore-feet, and pushed gently upward, through the tow which takes the place of flesh on the leg-bone, and through the loop in the body-wire, until about one inch of wire remains out at the bottom of the foot. The other end of the wire is now taken and re-inserted through the loop, so as to make it more firm, or, instead of inserting it twice, insert it once and bind it firmly to the body wire with thread, the wire is then passed down the opposite leg and out of the palm of the foot. The same operation being repeated with the hind-legs. Now that the wires are in their places, the neck and body should be properly filled with tow or cotton, but great care should be taken not to stuff it tightly. We have always stuffed the body very loosely, then, as the skin shrinks, instead of having a bulged appearance, the skin settles down and draws the body into

a natural posture. The incision which was cut in the skin should be sewed up with strong white thread (or, in case it is a black animal, black thread should be substituted.) taking care to part the hairs, and sew as few under as possible. Glass eyes of the same size and color as those of the animal's should now be placed in their sockets [Send 2ct. stamp for list of eyes] or they may be placed in from within the skin before the stuffing is commenced. The legs, tail and head should be arranged in their proper position, the hair brushed down, and the animal modeled in the posture desired. All this having been done, the animal must be attached to a board by making four holes at proper distances for the leg-wires, and placed in a dry, cool room to dry. Do not by any means place it in the sun. After the animal is thoroughly dried it may be removed from the board and placed on whatever desired, and the wire projecting from the head must be cut off close to the skull.

Now, patient reader, do not think that you can stuff an animal the first time, for it is simply impossible, but do not give up and we will guarantee you success. We spoiled over ten animals in trying to stuff one, and gave up all hopes of success a number of times, but we finally succeeded. If any of our subscribers desire to be enlightened a little more on any part of taxidermy, they need only send a 2 cent stamp and state what they wish to know, and we will answer it to the best of our ability. We deal in tow, eyes, etc.

TO BE CONTINUED.

Collectors notice our advertisements on the cover.

The Naturalists' Companion

A MONTHLY PUBLISHED IN
THE INTEREST OF NATURAL
HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, N. Y.

We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

SUBSCRIPTION.

Single Subscription,	50 cents per year.
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Sample Copies,	5 cents each.
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Remittances should be made by draft on New York, money order, postal note or by registered letter. No postage stamps taken.

Make all money orders and drafts payable to

CHARLES P. GUELF,
BROCKPORT, MONROE COUNTY, N. Y.

RANDOM NOTES.

A pearl has been found on the western Australian coast valued at \$20,000.

Vanadium, a white metal discovered in 1830, costs \$10,000 a pound.

Utah's mining output for 1884 is valued at \$5,257,021.44.

Earthquakes in North Japan are more numerous and severe in winter than in summer.

An animal tamer has used electricity as a subduer of unruly beasts with great success.

The “Rock City Geologist” is the name of a new twelve-page monthly, to be issued from a Nashville, Tenn. press, by J. A. Murkin, Jr. No. 1 appears before the collecting public about September 1st, 1885. Write for a sample copy.

Hon. L. E. Crittenden, Register of the Treasury under President Lincoln, presented to the University of Vermont some time ago his large and valuable cabinet of shells, containing from 2,000 to 3,000 species, and a rare collection of the eggs of American birds.

Dr. Newton told his hearers the other day that the hymnal for children in the Sunday school of science may be expected to give such a modern rendering of old hymns as this:

“Twinkle, Twinkle, little star,
I don't wonder what you are;
You're the cooling down of gases
Hardened into solid masses.”

The cause of the powerful muscular contraction of the claw of the common crab after it has been severed from the body with the scalpel has engaged the attention of a New York physiologist summering on the New Jersey coast. The contraction, he finds, is in the nature of a death throe to the tissue, but the rigidity continues for about forty minutes, when the rigid muscle spontaneously relaxes.

Advertisers—Notice our reduced advertising rates this month.

Subscribe for the NATURALISTS' COMPANION.

Of all the Lompac tribe of Indians, of whom fifty years ago there were some 4,000 in Santa Barbara county, California, there is but one survivor, and he is old and feeble, existing upon charity in the city of Santa Barbara.

We are informed that there is to be a new philatelic paper published in Buffalo, N. Y., entitled the "Queen City Philatelist."

It is in the ocean that what is probably the deepest water on the surface of the globe has been found. English scientific explorers dropped a sounding line 4,575 fathoms, about five and one-fifth miles. The American steamer Tuscarora sounded 4,600 fathoms east of Japan. Thus it would seem that the greatest height of mountains and the maximum depths of the sea very nearly correspond.

"The Orient" is an interesting little paper, and reflects great credit on its editors.

M. Albert Gandry has published some remarks on the skeleton of a cave hyæna discovered by M. Felix Regnault, and presented to the Academy of Sciences, Paris. Studies of this skeleton, which was recently found in the Gargas district, Upper Pyrenees, confirm the view heretofore advanced that the cave hyæna was merely a heavy variety of the spotted hyæna still surviving in Central Africa.

"The Hoosier Mineralogist and Archaeologist" is a fine little journal and a very valuable addition to the works on mineralogy and archaeology.

Advertisers notice our reduced rates on page 22 and take advantage of them now for they may raise soon.

"The Wasp" is an interesting paper published in the center of a mining district, at Beuna Vista, Col., by Miss Sadie Bay. She has our best wishes.

We stated in our last issue that this number would be covered with an illustrated colored cover. We have the colored cover, but not the illustrations. It was utterly impossible to obtain any cuts suitable for for such a purpose. Will try and have them for next issue.

We are sorry to state that the "American Osprey" has suspended. Mr. Talmage seems to have a hard run of fortune, as this is the second time he has started a paper and failed. We sympathize with him.

One of the most remarkable natural curiosities in America is a hole in a mass of solid rock on the Columbia river, near Salem, Va. It is one hundred and thirty-six feet deep; its width is forty feet at the bottom and sixty feet at the top. The descent is made by means of rope-ladders, and at the bottom of the hole the visitor finds a charming spot, for it is covered with a perfect coat of moss and ferns. In the summer it is delightfully cool, and in the winter it is comfortably warm, being protected alike from sun and winds. On one of the hottest days, last summer, the thermometer there registered forty-four degrees. It seems that there is a cave which leads downward, from one side of the hole, but the cave has never been explored.—GOLDEN DAYS.

Editors inserting a favorable notice for us in their paper and send a copy of the same, we will return the favor.

 SUBSCRIBE NOW !!!!!!!

Snow-shoveling, it is said, is still indulged in near Montezumi, Col.

We wish our readers would contribute more freely to these columns.

Exchanges inserted free to all subscribers.

We have received no correct answer to last month's puzzle yet.

Readers desiring information on any subject should insert in our Column of Inquiry, which is free.

We would like to exchange papers with publishers in all parts of the world.

WANTED.—Cuts of animals, birds, reptiles, insects, fishes, flowers, plants, minerals, fossils, planets, etc.

As we have not received enough subscriptions we could not illustrate this number, but will try to do so in our next issue.

Collectors having natural curiosities or relics for sale or exchange, will please send list and state lowest possible prices.

G. H. Baar, of New York, has sent in the largest number of subscriptions so far. Our readers should work diligently for the prize.

On account of the very hard times we have been obliged to make a cut in our advertising rates, this is a golden chance for advertisers, and they should secure spaces at once, for we may advance these rates soon.

We wish parties writing us would enclose a stamp if they desire a reply. A stamp is a small matter to them, but to us, answering from fifty to sixty letters per day, it is of considerable consequence.

We would like any of our readers to make us a call, when in town, at Ward's Opera House Block, Main Street.

Our paper has improved somewhat in this issue, and we shall keep on improving it with each issue until it is perfect. If we receive a sufficient number of subscriptions we will begin to use illustrations in our next number.

One of the greatest curiosities of the present day, found among the pines of central Wisconsin, was discovered near Knowlton a few weeks ago. It was in the form of a petrified squirrel, about the size of the common squirrel, it was taken from the heart of a tree by some woodsmen. It was of a brownish color, as hard as a rock, and was "as natural as life," even to the kink in its long bushy tail. The curiosity was carefully packed and sent by William Mulhellen, its owner, to President Cleveland, from whom a personal letter of thanks was received by the sender, saying it would be carefully preserved and placed in the public museum at Washington—TELEGRAM

While out on a collecting trip recently, accompanied by a few of our friends, we obtained four Black-billed Cuckoo's eggs, six Am. Goldfinch's eggs, four Summer Yellowbird's eggs and three bats. We found the bats clinging, head downward, to the leaf of a chestnut tree. After much trouble we succeeded in capturing two of them. These we fed upon flies, of which they ate an astonishing amount. Their color was a mixture of brown and yellow, except on the under parts, which was of a pale yellow, and the wings, which were nearly black. The bats were three inches long. On another trip, about a week later, accompanied by J. W. Shepherd, we found some fine deposits of fossil coral and fossil shells.

THE EARTH-WORM.

APOTHEOSIS OF THE WORM.

Dr. Chas. Darwin has written a work which is creating a profound sensation in scientific circles. He has been studying the common earth-worm for over thirty years, and has come to the conclusion that mankind is more indebted to that loathsome, wriggling creature than to any other race of the inferior orders of creation. The earth, according to Darwin, would be a desert were it not for the worm. Its value is that it eats dirt and turns it into vegetable mold. There are, on an average, on every acre of ground over 57,000 worms. These eat and digest from 8 to 16 tons of soil per acre, in the course of a year. Whatever passes through the intestinal canal of the worm becomes vegetable mold, and without this mold there would be no crops, no increase of grain, or the animals which feed upon the products of the soil. Nor is this all, the worm is the possessor of the memorials of the past. Its mission is to cover naked surface with vegetable mold. The deserted cities and memorials of the past are first hidden from sight by the ejecta of the worm, then comes the dust, and the sand storm, and the accretions from outside of our atmosphere. Troy is 200 feet underground, and it took 300 years to cover it with so much soil. This wriggling, loathsome creature is one of the most degraded and imperfect organisms known to the naturalist. It has no brain, no organs of vision, cannot hear, and has no sense of smell, it has a certain amount of intelligence, however, and knows enough to get out of the sunlight. But, notwithstanding its deficiencies,

it is the greatest benefactor, not only to man, but to the other superior animals. It may comfort fishermen to know that the worm they use in angling has but little nervous sensibility, and cannot be said to suffer pain when impaled on the fish-hook. It will not do to despise the worm, for, as a London paper well says, it from this time forth will wear the blue ribbon of science—DEMOREST'S MONTHLY

PREMIUMS FOR SEPTEMBER ONLY.

In order to fill our subscription list, we make the following stupendous offers, which we believe has never been equaled by any publisher :

The COMPANION one year for 25 cents to those who subscribe before September 10. Persons sending in their subscriptions between the 10th and 15th we will send as premium one specimen of each satin spar, fossil nuts, orthoclose, calcite and rose quartz. Those received between the 15th and 20th will receive pink satin spar, fossil nuts, fossil coral and rose quartz. Those received between the 20th and 25th will receive satin spar, fossil roots and calcite. Those between the 25th and 30th will receive a promæthea moth. Those whose subscriptions of 25 cents is received on the 10th will receive a fine silk moth.

Those wishing these premiums must send the regular subscription price, 50c, except in the first and last offer where but 25 cents is required. Cash must be remitted by postal note or by sending it in five and ten cent pieces inclosed with the letter. No club rates can be allowed on any of the above.

METEORS.

Blossburgh, Pa., July 18.—One of the grandest sights ever witnessed by the inhabitants of this place occurred at about five minutes of nine o'clock last night. The sky was suddenly lit up, and a meteor shot through the air from a southerly direction, and when within about fifteen feet of the ground in the rear of Engineer Ben Green's house it broke with a loud report, and two apparently red and white ball of fire descended to the earth. Two more meteors passed over the borough apparently about 100 feet high, going in a northerly direction.

Palmyra, N. Y., July 18.—A very brilliant meteor was seen at this place at 9:15 last night. It exploded with a loud report pieces of different colors flying in all directions. It was the largest ever seen at this place.

Two large meteors passed over Brockport the same evening about 9:5 o'clock

There is considerable discussion as to the origination of meteors. A number of prominent astronomers maintain that they are the fragments of some planet which have exploded, while a corresponding number of astronomers hold that they have originated from some terrific volcanic eruptions which has hurled these fragment far beyond the earth's attraction. We are not prepared to say which of the above is correct. The earth passes through vast masses of these meteors during the month of August, and any of our young friends may see numbers of them any clear evening traversing the heavens in all directions, propelled

by an irrepressible force. The bright light displayed by the meteors in the evening is the result of friction, caused by the marvelous speed with which it passes through the air. Meteors are generally composed of iron.

THE SIAMESE SNAKES.

A VERY SCALY PAIR OF TWINS
SEEN IN THE WILDS OF WEST
VIRGINIA.

Braxton county, West Virginia, can down the state on snake wonders. A gentleman living not far from the county seat lately succeeded in capturing a snake or a pair of snakes corresponding to the Siamese twins. The reptile has two heads and two tails, and the balance of the body looks like that of a single snake, with the exception of a slight depression both above and below, extending the entire length. The bodies join about six inches from the head, the tails are almost a foot long after leaving the body, while the length of the proportion joined is two feet and nine inches. The twins were first seen two weeks ago by a little son of the gentleman who possesses the wonder, who told his father that he had seen and showed him the track crossing the road. The gentleman made a thorough search at the time, but failed to capture the prize. He, however, ran across it a few days since and succeeded in noosing and taking it captive. Both the snakes are jet black, with a yellow ring just behind the head. They both eat and in traveling seem to be wholly of the same opinion as to direction, etc., stopping at precisely the same time, and appearing to have one mind about everything.—TELEGRAM.

THE GROUND-SQUIRREL.

(TAMIAS LYSTERIA.)

To C. W. D., Boston, Mass.

The ground-squirrel, when digging in the earth to form his burrow, if in grass-ground, they first cut the roots of the grass with their teeth, making as true a round hole as could be made with an auger, and as large—and no larger—as the full extent to which they can distend their cheeks with the roots and dirt thus taken out, which they carry away and hide in some out-of-the-way place previously selected. The dirt is dug out with the claws, directly into their mouth, and crowded well in, until their cheeks touch the sides of the hole, then away to their “dumping-ground,” and literally dig the dirt out of their mouth.

Prof. C. J. JENNER.

YELLOW-BILLED CUCKOO.

(COCYZUS AMERICANUS.)

This bird inhabits the woody districts of North America, east of the Rocky Mountains. It feeds chiefly upon the caterpillar and other larvae. It will attack a whole web of caterpillars, as they are attached to a limb of a tree, and will not leave one alive. It is therefore very valuable to the farmer. The back of the bird is of a pretty brown color, the breast is a very light yellow, sometimes pure white, and the legs dark green. The bird possesses a very long tail, generally about six inches long, and a somewhat curved beak, the upper mandible of which is black, while the lower one is yellow, and measures one inch in length. The entire

length of the bird, from tip of beak to tip of tail, is ten inches. Its nest, if it deserves that name, is composed of a few twigs laid loosely together, and is generally placed in wild grape vines. The bird lays four or five eggs of a light bluish-green, sometimes spotted with blotches of a very light green; size 1.12 by .83. The shell of the egg is very thin and breaks easily. The bird, when found on her eggs, makes no noise, but will set there until literally pushed off her nest; but, when finally started, she will glide silently away, her long tail standing out so majestically behind, and you will see nor hear no more of her until long after you have quit the locality. It is a very lonesome note that this bird utters, and it sounds more lonely to hear its cry on a summer evening, after the sun has set, when no other sounds are heard in the wood. Young readers do not think, as we used to, that the cuckoo builds no nest of its own, but lays its eggs in the nests of other birds. This is true of the European bird, but not of the American species.

“Kriss Kringel” is the finest little story paper it has been our fortune to behold. A continued story has just begun, entitled “The Boy Hunters, which is simply excellent.

As we go to press we receive a copy of “Tidings from Nature,” which is, to say the least, one of the finest natural history papers we have ever seen. The paper has just finished its first volume. May it still continue to prosper in the good work it has undertaken.

☞ Notice our premiums for September only.

COMETS.

Twenty comets which have been studied with the spectroscope have appeared to be essential alike in chemical composition, while each comet is continually varying in temperature, density and the amount of vapor emitted by its nucleus. Huggins states that the substance of these bodies undoubtedly contains carbon, hydrogen and nitrogen, and probably oxygen. Meteorites are evidently of the same nature as comets, and, while consisting chiefly of iron and other solids, can often be made to give up several times their volume of gasses. The idea that the light of comets and the phenomena of their tails are produced by electricity is gaining in favor among students of these subjects.

The discovery that comets are celestial bodies, extraneous to our atmosphere, is due to Tycho Brahe, who ascertained the fact by observations of the comet of 1557. Newton succeeded in demonstrating that they are guided in their movements by the same principle which controls the planets in their orbits; and Halley was the first, by determining the parabolic elements of a number of comets from the recorded observations, to identify the comet of 1682 with one which had been observed in 1607, and the observations recorded by Kepler and Longomontanus, and also with a comet observed in 1531 by Apian, at Ingoldstadt, and thus confidently to predict the return, at the end of 1758 or beginning of 1759, of a comet which would have the same parabolic elements. The number of comets belonging to our system, although great, is being constantly augmented through the

discovery of new bodies of this class. A comet was discovered by Swift, of Rochester, N. Y., on the morning of June 20, 1879, first seen four days before, but not determined to be a comet until the date named. Its position on June 20, about 11 P. M., was northern declination 60 deg. 40 min., and 2 hours, 27 minutes and 14 seconds. Observations on the next evening show it to be moving almost due north, and almost exactly one degree per day. It is small and faint, and is probably receding from the sun, so that it is not likely to become any more conspicuous than it has been, though it requires longer observation to determine its orbit.

SKELETONS.

A very excellent and simple method for procuring the skeletons of snakes, small birds, mice, fish, etc., is to procure a common cigar box, in the bottom and sides of which small holes are bored. Place the specimen of which the skeleton is desired in the box and bury it in an ant hill. The ants will enter through the holes in the box and eat away all the flesh, muscles, etc., leaving the perfect skeleton as the result. The skeleton should be placed in water for two or three days to extract the bloody color, then whitened with lime and alum and dried. It will require a week or ten days for the ants to clean the bones of the meat.

Iridium—Found native as an alloy with osmium in lead-gray scales, and is the heaviest of known substances, \$1,090 lb.—HOOSIER M. & A.

Will our readers send us all the natural history news they obtain?

CLUB RATES.

To persons intending to solicit subscriptions for the COMPANION. We will allow you a cash commission of 20 cents for each and every subscriber you will obtain. To be entitled to the above commission, you must, if not already a subscriber, send in your subscription with your first order. No commission can be allowed on your own subscription.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

C. P. GUELF, Brockport, N. Y., two good books, "Lawrence's Adventures" and "Young Trail Hunters," for the best offer of scientific books, instruments or specimens not in my collection. Will exchange the COMPANION for one year or natural history specimens for the above.

We would rather our readers would, instead of sending us letters recommending our paper, set an example for others (if they think our paper is worthy of their support) by sending in their subscriptions, for we cannot run a paper on letters of advice, encouragement, praise, etc., but only on the "ready come down cash." Those intending to subscribe should do so at once, for we will never lower our rates again as far as we have for the month of September. Just look at our premiums!

Anthracite is, geologically, the oldest form of coal.

The Agassiz Journal is doing a noble work in its endeavors to rid the collecting community of its numerous great frauds. The August number of the Journal has exposed an astonishing number of old frauds. Had we the space we would like to publish some of them; but, as we have not, we will keep our weather eye open and see that none of their advertisements enter our columns. Woe to the fraud that comes under the gaze of our terrible eye, for we will fall on him like a thousand of brick, and some one will have to pass the hat along the ranks of amateur journalism to pay the funeral expences.

The largest oleander in Florida, or probably anywhere else, is on Mr. Packwood's place at Spanish Town. It covers a space of ground thirty-six feet in diameter; from the ground to the topmost limb is twenty-five feet; at the surface of the ground the trunk is divided into twenty or twenty-five separate stems, the group being at least five feet through, and one single stem is, by actual measurement, fourteen inches thick.

A dispatch from McMurey, Texas, says: A farmer living six miles west of here discovered an immense fossil, the remains of a carnivorous mammal, which scientific men pronounce to be the remains of an ichthyosaurus. In length it is 12 feet, of which the head measures four. The jaws, teeth, tongue, ribs and vertebra are petrified.—DAILY ITEM.

Publishers copying from us will please give credit.

TABLES.

Below we show a lable most needed by collectors. The lable is to be attached to boxes or packages sent through the mails, and will prevent their loss, and also inform the person to whom sent of the sender. Price 10 cents per 100.

NATURAL HISTORY SPECIMENS ONLY.

POSTMASTER.

Should this package miscarry or if not called for, please inform me of the amount necessary to prepay its return. C. P. GUELF,

BROCKPORT, MONROE COUNTY, NEW YORK, U.S.A

HOW TO KILL INSECTS.

To A. N., BRESLAW, N. Y.—There are two very good ways known to us for quickly dispatching butterflies and moths. A red-hot needle passed through the thickest parts of insects will kill them instantly. But the most convenient way is to use the cyanide bottle, which is made in this manner: Procure a quart glass jar with a large mouth, (a baking powder jar is most commonly used) 5 cents worth of cyanide potassium, and some powdered plaster-of-paris. Break the cyanide into small pieces and place it within the jar, then mix a sufficient quantity of the plaster-of-paris with water to just cover over the cyanide. The plaster should be mixed as thickly as possible, and poured in the jar as soon as mixed, as it dries very quickly. After the mixture is sufficiently dry the plaster should be removed from the sides of the jar, and a piece of card-board cut the size of the inside of the jar should be placed on the

composition, and the cork given a coating of sealing wax. The bottle can be conveniently carried in the coat pocket, when in the field. When an insect is captured place it in the jar and the poisoned atmosphere will kill it quickly. The jar should be handled with care and suitably labled, for it is a deadly poison.

Column of Inquiry

This Column is open free to yearly subscribers only.

R. W. MERCER, CINCINNATI, O.—Can any one inform me of the address of T. H. Wise, late of Wheaton, Ill., also his antecedents.

C. A. S., N. Y. city.—The color of crow's eggs varies considerably, some being very thickly spotted, while others have but a very few markings.

B. T. P., DETROIT, MICH.—The egg of the pewee sometimes has small brown dots at the largest end.

T. O. Q., ROCHESTER, N. Y.—The meadow lark sometimes remains with us all winter, although it is a migratory bird.

R. C., BATH, N. Y.—I would like to get the address of the Rev. J. G. Wood, also that of Prof. J. D. Dana. Dana, we believe, resides at New Haven, Conn. We will refer Wood's address to our readers.

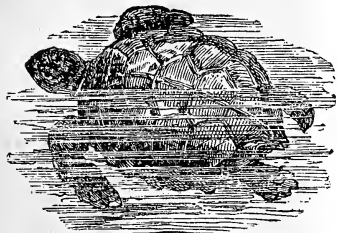
T. N. M., BOSTON, Mass.—What is the highest elevation attained by any one in a balloon. Will some of our readers please answer him.

M. O. L., SAVANNAH, GA.—The first microscope was made by Zacharias Jansens, a Dutchman, in the year 1590.

The Naturalists' Companion

Vol. 1. BROCKPORT, N. Y., SEPTEMBER, 1885. No. 3.

THE TURTLE.



GREEN TURTLE, (*CHELONIA VIRIDIS*).

"Beautiful soup, so rich and green,
Waiting in a hot tureen,
Who for such dainties would not stoop?
Soup of the evening, beautiful soup."--CARROLL.

TURTLE is the name of those Chelonian reptiles, the family CHELONIAE of some, which have a rather flat carapace, and fin-like paddles instead of legs, suited for swimming, and not for walking. The fore-limbs are much longer than the hind-limbs. The toes are not all furnished with nails; in some species there is only one on each foot, in others there are two. Turtles are all marine, and although they lay their eggs on the beach, seldom visit the shore for any other purpose. The young, soon after being hatched, make their way through the sand which covers them, and immediately betake themselves to the water. Turtles crawl slowly and awkwardly on the shore; but their movements in water are comparatively quick, and even graceful. Some of the species feed entirely on grass-wrack and sea weeds, which their powerful jaws cut with great ease; others prey on crustaceans,

mollusks, and fishes. The flesh of those which subsist on animal food is musky and unpleasant; but that of the species whose food is vegetable is much esteemed. The Green Turtle attains a large size, being sometimes six or seven feet in length and weighing 100 to 800 pounds. Another excellent species of turtle is the Edible Turtle, (*CHELONIA VIRGATA*), of the East Indies, which is frequently four or five feet in length. The Hawkbill Turtle, (*CARETTA IMBRICATA*), found in the warmer parts of the Atlantic Ocean, in the Indian Ocean, and in the Red Sea, is particularly valuable, as yielding the best tortoise-shell. The shell of a turtle, found fossil in India, had a length of 12 feet, and the animal is supposed to have been 20 feet long.

The following, in regard to these reptiles, we take from Wood's Natural History: "The very curious reptiles which are known by the name of tortoises are remarkable for affording the first example of a skeleton brought to the exterior of the body—a formation which is frequent enough in the lower orders, the crustaceans and insects being familiar examples thereof. In these reptiles the bones of the chest are developed into a curious kind of box, more or less perfect, which contains within itself all the muscles and the viscera, and in most cases can receive into its cavity the head, neck, and limbs, in one genus so effectually that when the animal has withdrawn its limbs and head, it is contained in a tightly-closed case without any ap-

parent opening. In the true tortois the feet are club-shaped and the claws blunt, and the neck can be wholly withdrawn within the shell."

A COLLECTING EXCURSION.

One day, meeting my friend on the street, I said to him: "Let's go down to Barker's Falls after geological specimens?"

"All right," he answered.

A few moments later we were trudging down the tow-path of the Black River Canal. We were each armed with hammer, chisel and a stout bag.

The town of Boonville had grown dim in the distance. Soon a lock-house appeared. Crossing over from the lock-house, we walked through a rocky field, and soon the rumble and roar of the waterfall was heard, and in a few minutes we were below it. There had just been a heavy rain, and the water poured over a high, rocky ledge, making a beautiful cascade. On the side opposite us was a high cliff. After gazing at the falls for a short time, we began to search for specimens. A cry of delight from my friend soon brought me to his side. He held in his hand an almost perfect orthoceratite. It had a long shell which was divided into a great many chambers.

"Isn't it a beauty?" he asked.

"A daisy," I replied.

I soon stopped, for at my very feet, firmly imbedded in the rock, was a fine specimen of fossil coral. Now I in turn uttered a cry of delight, which likewise brought my friend to my side. After admiring it for some time we again began to

look about us. Thus passed the day, and a pleasant day it was, and when night came we returned home with our bags well filled with fine specimens. FRANKLIN C. JOHNSON.

SILVER SWORD.

"What is silver sword?" This probably would be the first of many questions the reader would ask upon seeing the title. Silver sword closely resembles grass, but it is covered by a kind of soft down of a silvery color, from which it takes its name. Its root, for my specimens seem to have but one, is broad and flat; somewhat like a claw. Only one place in this wide world boasts of this strange plant. It grows on the summit of the famous living volcano, Mona Loa, in Hawaii. There it is also scarce, as the wild goats obtain their scanty existence upon it. In such places only where these creatures are unable to reach it is it to be found. J. ALLEN, JR.

THE DARTER.

(PLOTUS ANHINGA.)

This odd bird is very closely allied to the cormorant, but it has a bill longer than the head, straight, slender, and very sharp-pointed; it has a remarkable long neck, from which it derives the name of snake-bird. It lives on fish, which it strikes with its sharp bill, and by which the fish is pierced, as with a dart, and hence the name darter. Its length is about three feet, from tip to tip of wings, is five feet, and the bill is four inches long. The color of this bird's neck, and all the under parts, is greenish-black; the tail is black,

tipped with white; the back and sides are black—the sides spotted with white; from the crown of its head a white strip of feathers runs part way down its neck. Its legs are only about three inches long, and the feet are webbed, as in all swimmers. The darter builds its nest in trees near the water, so that it can dive into it in time of danger. It lays from three to five eggs of a bluish or dark greenish-white color, oval in shape. Its habitat is near the fresh waters of the South Atlantic and Gulf States. A gentleman who saw these birds in Florida, says: "They delight to sit in little groups, on dry limbs of trees overhanging the still water. At such times, if any one approaches them, they drop off the limbs into the water, as if dead, and for a minute or two are not to be seen, when suddenly, at a great distance, their long, slender heads and necks appear, like a snake rising out of the water. When they swim no part of them is to be seen except the head and neck, and sometimes the tip of the tail. In the heat of the day they are seen in great numbers, sailing very high in the air over the lakes and rivers." KINNEY.

NEST AND EGGS OF THE RED-EYED VIREO.

(VIREOSYLVA OLIVACEA.)

This bird breeds very extensively in this locality, [Eastern North America] and their nests are a very common thing. They are very fond of building in low bushes, but their nests may be found in trees from 25 to 50 feet from the ground. The nest is composed of very thin bark and grass, and lined with grape-

bark and fine grass. The outside of a new nest is very curiously covered with cobwebs and bits of white birch bark. The nest is usually placed at the extremity of a long limb, and is about 3x3 inches outside and 2½x2 inches inside. The eggs are four in number, of a glossy white ground, sprinkled near the larger end with small reddish-brown spots. In size they average about .75x.60. FALCON.

Near the mouth of the Little Cheyenne river, Dakota, is a rock with curious indentations. It is twelve feet long by seven or eight wide, and rises above the surface of the ground about eighteen inches. Its edges are angular, its surface flat, and shows little effect of ice action. It appears to be magnesian limestone, and its whiteness makes it a conspicuous object. On the surface are several deep and perfect footprints, as though made by the left moccasined foot of a woman or boy. It is known to the Indians as a religious rock, and they worship it.

The celebrated collection of Indian relics of J. H. McIlvain, late of Philadelphia, is to be sold at auction, at the above named place, October 19th and 20th. Those who are likely to bid at this sale can obtain a catalogue by addressing J. W. Haseltine, 3812 Spruce St., Philadelphia, Penn.

The nightingale and crow have vocal organs similarly constructed; yet one sings and the other croaks.

Selma, Ala., has over sixty artesian wells, and the water from no two of them alike.

The Naturalists' Companion

AN ILLUSTRATED MONTHLY
PUBLISHED IN THE INTEREST
OF NATURAL HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, - - N. Y.

We request all of our readers to send us a description of their
Collecting Excursions, their Finds, or any items they may think
will be of interest to the readers of the COMPANION.

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CHARLES P. GUELF,

BROCKPORT, MONROE COUNTY, N. Y.

RANDOM NOTES.

Persons writing us and not receiv-
ing an answer within a reasonable
time, should write again, as we are
apt to make mistakes or mislay the
letter.

A very bright light is obtained in
China from candles made of wax
supplied by insects.

We would like very much to
have our paper become the official
organ of some natural history so-
ciety.

The heart of a Greenland whale
is a yard in diameter. He cannot
be called a heartless creature, even if
he does eat people.

The parties who advertise in this
paper are perfectly reliable. You
will do us a favor by giving them
an order.

Those of our readers who desire
a good rubber stamp should pur-
chase of Frank K. Rising, of Lena,
Ills. We know his goods to be fine.

J. Allen, Jr., of Lake View, Ills.,
informs us that he measured an ar-
tichoke on his premises, and found
it to be nine and one-half feet high,
and it has not yet flowered.

A pair of bald eagles have made
their home near Stony Point, Mich.,
on the margin of Lake Erie, for
a number of years, and it is believed
that they are nearly if not quite sev-
enty years old.

We extend our thanks to J. M.
Beers, of Elmira, N. Y., for a copy
of his International Dealers and
Collectors' Directory. This direc-
tory in made up in fine shape, and
should be in the hands of every col-
lector or dealer. Price only 10 cts.

Birds have their favorites among
trees all over the world. Robins,
catbirds, finches, cedar-birds, and
others, prefer pines, spruces and
cedars. The hawk prefers the elm,
the crow, the beech; and the little
bluebird seems to regard the apple-
tree as the best place for its nest.

SUBSCRIBE IMMEDIATELY.

See our fine premiums for October.

The oyster is full-grown in about five years.

Salmon can swim five miles in an hour, and even ascend cataracts.

Publishers copying from us will please give credit.

Amateur papers printed neatly and cheaply at this office.

Persons desiring a reply to their letters must enclose a stamp.

Readers, we promised to improve with each issue. Are we keeping our promise?

You will do us a great favor by showing this paper to your friends and inducing them to subscribe.

B. L. Williams, of New York, won the prize for the greatest number of subscriptions.

Our readers have our thanks for their promptness in sending in contributions this month. We hope they will continue to do so.


C. B. Guyon, of this place, has left a curiosity with us, in the shape of a plum $6\frac{1}{2}$ inches in circumference, and $2\frac{1}{2}$ inches in diameter. Next.

We have a number of orders for specimens, labels, etc., which we have been unable to fill, on account of the rush. These will be promptly filled after this issue is off the press.

As no one has been able to solve the puzzle published in No. 1, there is no use in our publishing the answer; yet if any one wishes it they can obtain it for a two cent stamp.

Notice the ad. of Warren Carter on the cover. His minerals are first-class in every respect. He is perfectly reliable, and will give those who favor him with an order one of the finest of bargains.

We will accept specimens, instruments, looks, etc., etc., in exchange for subscriptions and advertising space, at three-fourths their actual value. Thus, for one dollar's worth of specimens we will allow seventy five cents worth of advertising space.

 We will sell the cuts we have in this issue at the following prices: Turtle, 30 cents; bird, 40 cents; bear, 65 cents, or will sell all for \$1.25. We will exchange these cuts for others. These cuts have never been used before.

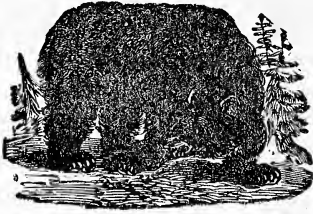
The Hawkeye Observer is one of the most interesting natural history papers we have seen. It is full to the brim with good, solid reading—a feature the majority of our exchanges fail to possess. Naturalists' Companion and Hawkeye Observer for six months, only 40 cents.

A large number of persons have wrote us asking how they could safely send the money for their subscription. Simply place five ten-cent silver pieces in the envelope with your letter, or better still, send by postal note. We shall return all stamps sent us after this date.

Prot. Oliver Davie informs us that the second edition of his "Egg Check List of N. A. Birds" will appear in about sixty days. It is to be complete and much enlarged, and is to contain ten full page plates of birds and their nests, drawn and engraved by Theodore Jasper, A. M., M. D. There is not, we believe, another person in America who has done more for the advancement of Oology than Mr. Davie has.

In the whale the upper lip falls down like a curtain, overlapping the lower jaw several feet.

Notice our many improvements.

THE BEAR.BLACK BEAR, (*URSUS AMERICANUS*.)

Bear, (*URSUS*), a genus of quadrupeds, the type of a family called *URSIDÆ*, belonging to the order *FERÆ*, sub-order *CARNIVORA*, and tribe *PLANTIGRADA*. The American black bear is found in all parts of North America. Its total length seldom exceeds five feet. The fur is soft and smooth, and generally of a glossy black. It usually exhibits a timid disposition, seldom attacks man; feeds chiefly on berries; occasionally visits gardens for the sake of cabbage and other vegetables; and strongly prefers vegetable to animal food, but has recourse to the latter when pressed by hunger, and in such circumstances occasionally approaches human habitations and captures pigs, which it endeavors to carry off. The bear is easily tamed, when young, and can be learned a number of tricks such as dancing to music, walking on the hind legs, etc. The bear is a fine climber, and generally a good swimmer. The paws of the bears are armed with long and sharp talons which are not capable of retraction, but which are most efficient weapons of offence when urged by the powerful muscles which give force to the bear's limbs. Should the adversary contrive to elude the quick and heavy blows of the paw, the bear endeavors to seize the foe round the body, and

by dint of sheer pressure to overcome its enemy. In guarding itself from the blows which are aimed at it by its adversary the bear is singularly adroit, warding off the fiercest strokes with a dexterity that might be envied by many a pretender to the pugilistic art. J. G. Wood says: "During the autumn the bear becomes extremely fat, in consequence of the ample feasts which it is able to enjoy, and makes its preparations for passing the cold and inhospitable months of winter. About the end of October the bear has completed its winter house, and ceases feeding for the year. A curious phenomenon now takes place in the animal's digestive organs, which gives it the capability of remaining through the entire winter in a state of lethargy, without food, and yet without losing condition. From the end of October to the middle of April the bear remains in his den, in a dull lethargic state of existence; and it is a curious fact that if a hibernating bear be discovered and killed in its den, it is quite as fat as if it had been slain before it retired to its resting-place. Sometimes it is said that the bear partially awakes, and in that case immediately loses its sleek condition, and becomes extremely thin. During the winter the bear gains a new skin on the balls of the feet, and Mr. Lloyd suggests that the curious habit of sucking the paws, to which bears are so prone, is in order to facilitate the growth of the new integument."

We have just received from A. M. Shields, Los Angeles, Cal., a fine assortment of western birds' eggs. Reader, give him an order. See ad. Price-lists printed cheaply by us.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

R. D. GOSS, New Sharon, Iowa.—Fossil shells, corals, encrinurite stems, crinoid stems, oolite, etc., for fossils from other states, or any thing suitable for a cabinet collection.

J. ALLEN, JR., Lake View, Cook Co., Ill.—Eggs and newspapers to exchange. A collection of 100 tin tags to exchange for specimens of any kind. Write first.

EUGENE CALDWELL, North Stamford, Fairfield Co., Conn.—Fine cabinet specimens of albite, microcline, beryl, spodumene, gypsum, garnets in mica schist, muscovite, curved mica and rose quartz to exchange for good specimens of other minerals.

WARREN CARTER, Wallingford, Pa.—Fresh and salt water shells, all correctly labelled, from this vicinity and California; fossils, minerals, and natural history specimens, including a few birds' eggs (Gambel's quail), and 17 year locusts, all in first-class condition, and correctly labelled, for marine and other specimens. No postals wanted.

FRANK BOLL, 102 Saratoga ave., Rochester, N. Y.—A piece of elephant tusk 3x4 in., a piece of glass of Grant's casket $\frac{3}{4}$ in., a piece of the led it was lined with 1x1 in., a piece of sugar-cane 3 in., a book, "Janet's Repentance," and a six-pence book, "Mabel Vaughan," from London; "Davie's Egg Check List," for coins, U. S. half-cents and foreign coppers. No silver coins wanted.

FRED BORGHALTHAUS, Lawrence, Kansas.—I have beetles and butterflies of this state to exchange.

Box 152, La Hoyt, Iowa.—Minerals for stamps, coins, novels, Indian relics, confederate bills and all kinds of curiosities.

ARTHUR NEVILL, Breslau, Suffolk Co., N. Y.—A scroll-saw, hand power, steel bow, wood handle, 12 extra saw blades, 29 patterns, only used once, for the best offer of a parrot. A book called "The Dog Cruso," several price-lists and magazines, including Harpers' Weekly in mourning for Gant, stamping outfit (any name), 4 old U. S. postal cards, fossil shells, and a few other curiosities; directions how to make and use sensitive paper, 431 postmarks, (276 var.), 2 real agates, 6 different foreign coins, and 2 live land turtles, separately for rare postage stamps or good offers.

We will give our subscribers 20 cents for every new subscription they send us.

We have a number of articles written by our friends for this paper, which were crowded out of this issue, but will appear in the next.

The Curios and Young Naturalists' Journal are soon to make their appearance,

James C. Jay, of La Hoyt, Iowa, is to issue The Curiosity News Oct. 25th. The more the merrier.

It is estimated that if the earth should come into contact with another heavenly body of the same size, the quantity of heat developed would be sufficient to melt, boil and completely vaporize a mass of ice fully 700 times that of both the colliding worlds—an ice planet 150,000 miles in diameter.

INTERESTING MINES.

A ride of about ten miles brought us to the brow of a hill overlooking two famous garnet mines; one owned by a New York Stock Co., and the other by James Wren & Co., of Chester Heights, Pa. The former was visited first, and proved to be well worth the trouble taken to get there. Here are employed a force of about fifteen to twenty men, during the mining period, which had just finished till fall. A force constantly is employed during the winter of eight to ten men. We were first shown the mine, which is a large excavation 30 to 50 feet deep. The garnet is mined in solid lumps, being mixed with another mineral. It is carried by a small car on a track to the factory, which is a large building, about 100 yards distant. The mineral is taken out by means of dynamite and steam, and several tons are mined daily. It is then stored in the building, to be worked in winter. After securing some fine specimens of the mineral in lumps, we were conducted to the factory. Here we saw the full process. The lumps are put through three crushers, and reduced, first to pieces the size of two fists, then smaller, and it is put through steam rollers, being about the size of peas. It is then washed by means of a stream flowing near, and again rolled, and again washed and rolled, if to be reduced to a fine powder. It is then thoroughly dried by means of a drying board, and put in bags, ready for shipment. It makes the finest kind of garnet paper. During the month of July, \$5,000 worth was shipped to Boston, Mass. alone. All foreign matter is floated off during the wash-

ing, as it is much lighter than the garnet. The garnet is ground into various sizes; some are quite large, while others are reduced to a fine powder. After spending about an hour here, we visited James Wren's, which is just across the street. Here there is a finer quality of mineral mined; the garnet being purer. The machinery is also better. They mine as high as ten tons a day, which is taken out by means of dynamite. This mill was not running at the time, as they were making extensive improvements. The plan of crushing is somewhat different from that seen at the first mill, as it is all done with one crusher, from the coarse down to the fine powder is from the same machine. The process of washing and drying is the same. About eight grades of powder are made here, which is shipped in large quantities. Any person coming to Delaware county, would do well to visit these famous mines, which, I am told, are the only ones in this country where garnet powder is made. We returned home well pleased with our trip.

WARREN CARTER

Wallingford, Pa.

"Youth's Golden Hours" is the name of a bright, eight-page, illustrated monthly story paper to be published soon, by E. S. Burns, of Dayton, Ohio. This paper we are confident will be a grand success with so able a person as Mr. Burns at its head. Reader, see ad., then subscribe.

In Paris there are 150 tradesmen who deal in nothing but old postage stamps.

THE BEAVER.

(CASTER FIBER).

In North America formerly the beaver was in great plenty, but owing to the Hudson Bay Company its numbers are greatly reduced, still in some places it is found quite plentiful. Beavers live in colonies beside some clear creek or spring, although they sometimes build on the banks of a lake. To make the water at all times deep enough, the beavers fell a great number of trees on the banks, always taking care to fell them toward the water. These are cut into logs about three feet long, carried to the river and sank by means of stones and mud placed upon them. The logs intended for the dam are first stripped of the bark, which is carried to their lodges and stored up for winter's use. These dams are about twelve or fifteen feet thick at the base and two feet or so at the top. The lodges are curious structures made of mud, moss, and twigs mixed together, and are very hard, being frozen by the cold winter, and, as each summer a new coating is put on, the wall becomes very thick, so that the beaver is safe from the attacks of its greatest enemy, the wolverene, (*GULO LUSCUS*). The beaver works in the night, so that its various movements are not very well known; but it is known that the beaver does not, as was formerly thought, use its tail as a trowel for laying on the mud.

J. ALLEN, JR.

ERRATA.—In A. Nevill's exchange, on page 41, the word Gant should be Grant.

Advertisers, give us a trial "ad."

PRIZE.

We will give any three of the portraits mentioned on page 46 for the best article on the above bird, Yellow-crowned Warbler, (*DENDROECA CORONATA*).

CORRESPONDENCE.

This Column is open free to yearly subscribers only.

To T. N. M., Boston, Mass.—The highest elevation ever reached by man in a balloon is seven and one-half miles. The air was so thin at that great height, and also so cold, that the men in the balloon, Glaisher and Coxwell, only escaped by a superhuman attempt. J. ALLEN, JR.

W. G. T., Plymouth, Conn.—We accept you offer with thanks

J. N. A., Lake View, Ill.—Yes, it is very easy to identify birds' eggs by the use of Davie's Egg Check List. You can obtain the paper by addressing H. M. Downs, Rutland, Vt. The mineral you sent for identification is fibrous asbestos. We have no idea as to the worth of a silver sword plant, still it must be very valuable.

R. D. G., New Sharon, Ia.—The following description of the Am. Goldfinch or Yellow-bird we take from Davie's Check List: "This

species is also known by the name of "Lettuce Bird." In his "Reports on the Birds of Ohio," Dr. Wheaton has the following on its nesting habits: "The Yellow-bird breeds late, with us, usually in July. The nest is built in trees. Often the shade trees or fruit trees in cities are chosen, and they appear to be the only birds breeding with us whose nest is ever placed in a peach tree. It is usually from fifteen to twenty feet from the ground, and built of moss, grass and small vegetable fibers, thickly lined with vegetable down. The eggs are five, light bluish-white, unmarked. .65 by .52." Will some of our readers give him a description of the summer yellow-bird through this column.

VOLCANOS and EARTH-QUAKES.

Many have been the theories put forth in regard to these two great phenomena. Here on the Pacific coast, seems to be the paradise of both, particularly the later. In Loma county, not many miles north of San Francisco, is a mountain that has but recently begun to smoke and rumble, and earthquakes are abundant. "Is an earthquake caused by gases?" Such is the question that has been propounded by many great naturalists. Proctor says that they are not; but that water alone is responsible. This seems a very reasonable idea of the matter, if we look at it in the right light. Suppose an immense quantity of water is suddenly precipitated into the bowels of the earth. The water is converted into steam; the steam is heated until it expands, so there is

not enough room for it; it then either forces rocks, etc., up or in forcing a passage along under the earth's crust causes an earthquake. If the steam is heated so that it expands suddenly, and it finds too much resistance on each side, and cannot face the rocks etc., which obstruct its way out, it will open a large fissure in the earth, so as to allow itself to escape. Steam is one of the greatest agents in the world—greatest next to electricity, which is not yet fully understood.

TIMOTHY HAYSEED.

TAXIDERM.Y.

A serial on preparing and preserving animals, birds, reptiles, insects, etc.

PART 3—BIPEDS.

SKINNING.

The best time in the year for procuring birds, or in fact any animals, for stuffing, is in the spring, for at that season their plumage is in the best condition. Birds should always be shot from behind, if possible, as it is less liable to destroy the plumage. Immediately after the bird is killed the feathers should be carefully raised and some plaster-of-paris put on the wounds to prevent the blood from flowing, and a quantity of cotton inserted in the throat and nostrils. The bird is now laid on its back on a perfectly smooth board, the head toward the left arm. Part the feathers from the top to the bottom of the breast bone, when a broad interval will be discovered. A sharp scalpel is inserted at the top of the bone and an incision made down to the bottom of it,

taking care not to penetrate so deep as to cut the skin which covers the intestines. As the skinning is proceeded with flour should be dusted on the flesh to keep the feathers from sticking to it. The skin can now easily be separated from the sides by the use of the scalpel. Press the thighs inward and pull the skin down far enough to enable you to separate the legs from the body at the knee joint. The skin is pulled down as far as the rump, and severed from it close to the roots of the tail, and in such a manner as not to injure the feathers. The skin is pulled up till the wings are reached, the bones of which are severed at the shoulder joints; it is then drawn up until the back of the skull is laid bare (in some birds, such as woodpeckers, the skin cannot be drawn over the head on account of the very small neck, in this case an incision is made in the back of the neck), when the vertebrae of the neck are separated from the head close to the skull; and the whole body is now free from the skin. You now proceed to remove the brains by making a hole in the back of the skull. The eyes must then be carefully taken out, and all fleshy matter removed from the head, especially under the lower mandible. In skinning the neck and head, great care must be taken not to enlarge the opening of the ears, and not to injure the eyelids. The flesh from the wings, legs and rump must then be carefully removed with the scalpel (cutting knife), and the cavities of the skull filled with cotton or tow. The whole inside of the skin, head, etc., must be thoroughly dusted with arsenic or arsenical soap. Now, reader, we

have carried you nearly through the mysterious art of taxidermy; one more lesson and you will be competent for the regular course, and after that we will give you a thorough course in the different branches of the art, including instructions in preparing insects, reptiles, eggs, etc. This serial will probably continue for a year or so. If any of our readers get mixed up in their work they should inform us, and we will cheerfully explain the way out of their trouble.

PICK-UPS.

Advertisers, give us an ad., you'll never regret it.

We wish to exchange ads. with every paper published.

Two good stamp papers—*Empire State Philatelist* and *Stamp World*.

The *Agassiz Journal* improves with every issue.

The *Hermes* is A No. 1 advertising medium.

Our readers must pardon us in the lateness of this month's issue. We will try to catch up soon.

The *Hoosier Naturalist* is before us in all its glory. No wonder it succeeds, with two such men as Jones and Trouslot at the wheel.

Remember, readers, we will print you papers, price-lists, circulars, envelopes, etc., cheaper than any other printer. Write us for an estimate on any work. Satisfaction guaranteed.

Prof. Nowry, in hunting the grebe, noticed a nesting bird pushing its floating nest from the shore, sitting upon its side and paddling the nursery that contained its eggs—*AGASSIZ JOURNAL*.

PREMIUMS and PRIZES FOR OCTOBER.

We will send the COMPANION one year to those who subscribe before Oct. 5th for 35 cents. All subscriptions after that date must contain 50 cents (no stamps), for which they will receive the COMPANION for one year, and as a premium, a portrait of any one of the following eminent scientists:

Prof. Louis Agassiz, Duke of Argyll, Arago, S. F. Baird, Pres. F. A. P. Barnard, Sir David Brewster, Dr. W. B. Carpenter, Columbus, Prof. J. D. Dana, Charles Darwin, Dr. John W. Draper, Michael Faraday, Benj. Franklin, Sir John Franklin, Galileo, Prof. Asa Gray, Prof. H. L. F. Helmholtz, Prof. Jos. Henry, Sir John Herschel, Alex. Humboldt, Prof. T. H. Huxley, Thos. Jefferson, Dr. E. K. Kane, Baron Liebig, Sir John Lubbock, Sir Chas. Lyell, Prof. O. C. Marsh, Commodore Maury, J. S. Mill, Sir Roderick Murchison, Prof. Simon Newcomb, Prof. Richard Owen, Herbert Spencer, Prof. John Tyndall.

These portraits are first-class steel engravings $9\frac{1}{2} \times 12$ inches.

Persons whose subscription is received on the 10th of the month will get an additional portrait. No club rates can be allowed on the above.

PRIZES.

Open to subscribers only. Subscriptions may be sent in with the answers.

For the best article on any subject pertaining to Natural History, a good book on Taxidermy.

For the first correct answer to the following puzzle, a \$1.00 collection of curiosities. List for selection sent to solver.

stand	take	to	taking.
I	you	throw	my

For the largest number of subscriptions sent us before Nov. 1st, to be not less than five, a book entitled *Birds' Nesting*, value, \$1.25.

For the first correct answer to the following puzzle, two portraits of the above scientists.

Behead a mineral and leave soft scrapings of cloth.

Behead a mineral and leave a way of passage.

Behead a mineral twice and leave to cheat.

Behead a mineral and leave the opposite of young.

Behead a mineral and leave to corrode.

Behead a mineral twice and leave a quadruped.

Behead a mineral twice, then prefix a letter and leave it angry.

We will give one dollar in cash to the person sending us the first correct list of answers to the following questions.

When was the telescope invented, and by whom?

In what position does the night-hawk rest, when on a limb of a tree?

Who invented the diving bell?

When was the Chinese wall built?

Can a bee sting twice?

If a pail containing water is revolved, does the water revolve also?

To what class of animals does the whale properly belong?

OPEN TO ALL, whether subscribers or not. We will send the COMPANION one year and two of the above portraits to the one who will make the greatest number of words out of the letters in the name "Naturalists' Companion."

THE NATURALISTS' COMPANION.

VOL. I.

BROCKPORT, N. Y., OCTOBER, 1885.

No. 4.

A LUMP OF CARBON.

Tell me, lump of carbon, burning
Lurid in the glowing grate,
While thy flames rise twisting, turning,
Quench in me the curious yelping,
Ages past elucideate.

Tell me of the time when, waving
High above the primal world,
Thou, a giant palm-tree, lifting
Thy prond head above the shifting
Of the storm-cloud's lightning hurled,
While the tropic sea, hot laving,
Round their roots it billows curled.

Tell me, did the Mammoth, straying
Near that mighty trunk of yours,
On the verdure stop and graze,
Which thy ample base displays,
Or his weary limbs down laying,
Sleep away the tardy hours?

Perchance some monstrous Saurian, sliding,
Waddled up the neighboring strand,
Or leaped into a neighboring sea,
With something of agility,
Though all ungainly on the land;
While near your roots, in blood stained fray,
Maybe two Ichthyic beasts colliding,
Bit and fought their lives away.

Tell me Ancient Palm-corpses, was there
In that world of yours primeval
Aught of man in perfect shape?
Was there good? and was there evil?
Was it man? or was it ape?

Tell me, lump of carbon, burning
Lurid in the glowing grate,
Lies there in each human face
Something of the monkey's trace?
Tell me, have we lost a link?
Stir thy coaly brain and think,
While thy red flames rise and sink,
Ages past elucideate.

—CHAMBER'S JOURNAL.

THE BANKS.

Away up in the bleak, cold north,
the ever-falling snows slide down
the mountain sides into the
rocky valleys. Here too they can-
not stay, as the increasing snows
on the mountain side force them for-
ward, and as the pressure increases
the snow is converted into solid mas-
ses of ice, which is slowly but surely
making its way toward the sea. As

slowly it moves along it breaks off
great pieces of rock that stands in its
way. Other rocks upon the sides
of the gorge, loosened by the severe
frosts of the Arctic winter, fall down
upon this ice river or glacier and are
carried on its icy bosom to the sea.
Here the glacier breaks up into huge
pieces called icebergs. Many of the
rocks still remain on them; some
are of course dropped, but great num-
bers of them are frozen in tightly.
These huge bergs are carried south-
ward with their heavy burdens.
When they near New Foundland the
influence of the Gulf Stream soon
tells, and many of the icebergs are
dissected by the warm water. The
sun too has its effect, melting ice
which runs in little rills down the
sides of the bergs, cutting them in
many pieces which fall into the water
with a splash that resounds for miles
around, and that lashes the sea into
fury. Most of these icebergs fall to
pieces on the shore of New Found-
land, and unshipping there huge car-
goes of rock unceremoniously into
the sea, float southward to disappear
for ever in the deep. After ages
these cargoes made a great plateau
in the ocean, and this to-day is what
we call the "banks of New Found-
land." Thus, reader, you see that
the Arctic world is slowly but surely
being shipped southward.

J. ALLEN, JR.

It is estimated that no less than
four hundred millions of mtecors
reach the earth daily.

BLUE PRINTS.

Although this article does not come exactly under the head of natural history, yet as it may be useful to some of the readers of the COMPANION for copying ferns, seaweeds, leaves and things of like nature, I give it here. First procure from a chemists 14-15 oz. of Iron Citrate and $\frac{5}{8}$ oz. of Potas Prussiate (red). Now mix the Iron Citrate with 6 oz. of water and the Potas Pruciate with 6 oz. of the same fluid, keeping them in separate vessels. When the two solutions are complete mix them together thoroughly. This last operation should be performed in a dark room, and the solution should be kept dark, as contact with the light will spoil it. For use apply to the paper with anything suitable. Lay the paper on a flat, smooth surface, with the leaf (or whatever you wish to copy) on it, and on top of the whole place a piece of glass so as to make the leaf lie close to the paper. Now expose for ten or fifteen minutes to the direct action of the sun and then soak in clear water. This print is very useful for copying seaweeds, leaves, ferns, etc. Of course with anything opaque it gives only the outline, but this is superior to drawing. Transparent objects, such as those drawn on glass can be copied entire. If you happen to have, or can procure from a photographer, any old negatives, these can be copied very nicely by substituting them for the piece of plain glass laid over the paper.

FALCON,
Plymouth, Conn.

Traces of gold can be found in the ocean water.—So, GEOLOGIST.

INTERESTING ITEMS.

Bone is twice as strong as oak and to crush a cubic inch of it, it would require a weight of 5000 lbs.

In Iowa were found the remains of a mastadon, and it had two molar teeth, one weighing $26\frac{1}{2}$ lbs. and was 13 inches broad on the surface. Its spinal column consisted of seventeen inches in each vertebra.

The largest tunnel in the world is that of St. Gothard, on the line of railroad between Lucerene and Milan.

It is said that oil poured on the water at sea, when it is very rough, produces a remarkable effect. It calms the water and gives it a glassy appearance. It was tried off Peter Head, England.

MATTIE C. GARRETT,
Steubenville, Ohio.

LIFE ON THE PLANETS.

The conclusion of the whole matter, says Professor McFarland, so far as astronomy and physics can now tell, is this:—That the four large outer planets have not sufficiently cooled down to allow life on their surface such as we see on the earth; that Mars gives all telescopic and spectroscopic probabilities of conditions compatible with life as we see it; that the earth certainly for millions of years has been covered with multifarious life; that of Venus and Mercury we have no certain knowledge, and that the statelites are pretty certainly not fitted for such life as is on the earth, that, in particular, our moon has no water and no atmosphere, consequently no climate or vegetable life. If the

sun and the planets continually loose heat, then there will come a time in the far future when the sun itself shall go out in everlasting night, and the planets cool down so that the "eternal snow" would be hot compared with the degree of cold throughout all space where everything shall be dead.

BALTIMORE ORIOLE.

(ICTERUS GALBULA).

Of all the birds which are inhabitants of this country, but few surpass the Baltimore Oriole for richness of plumage and melodiousness of song, which consists of from four to ten full, loud and mellow notes. The true Oriole is not found in this country, being a resident of Europe. But the Baltimore bird, or Baltimore Oriole as it is called from its resemblance to the European Oriole, is peculiar to this continent, being found from Canada to Brazil. It is the most beautiful of our summer visitors, the plumage being very brilliant, particularly so in the male, which has its head, neck, fore part of back and the tail glossy black; its quills, excepting the first, are margined with white; the whole under part of wing coverts and posterior part of back is bright orange and vermillion; the breast, under part of neck and the end of the tail feathers are tipped with dull orange. Its bill and feet are of a bright blue color. The above plumage is when the bird is three years old, before which time it is mixed with olive brown. The female Oriole is, as in the case of most birds, less beautiful than the male, though it still presents a very charming appear-

ance, being brownish-black mixed with dull yellow on the neck and fore part of back, while on the hind part of back, it is covered with brownish-yellow, brightest on the rump. The Baltimore Oriole builds a very curious, ingenious and wonderfully interesting nest, it being a pendulous cylindrical purse-shaped pouch of six or seven inches in depth, and suspended from the end of a lofty branch. This remarkable structure is generally made of long grass, although other material, such as horse hair and thread, is sometimes used, and is woven with great nicety. The bottom of the nest is lined with some soft material, such as thistle blows and the like. The eggs of this marvelously beautiful songster are from five to six in number, about an inch long, pale brown in color and spotted and lined with dark brown, making a very handsome egg. The Orchard Oriole, which arrives in May, is nearly the same in plumage and general appearance. It lays five eggs, of a whitish-pink, dotted at the end with purple spots. HARRY HARRIS,

Edinboro, Pa.

A woman in Norwich, Conn., some time ago wanted to dispose of a cat and some kittens. She tried to give them a little laudanum in their milk first; to make them easy to handle. But the old cat refused to drink the doctored milk, cuffed the kittens away from it, and then covered up the saucer with a mat. The cats still live.—GOLDEN DAYS.

Ink spots may be removed from eggs by means of a weak solution of chloride of lime.—A. A. JOURNAL.

The Naturalists' Companion

AN ILLUSTRATED MONTHLY
PUBLISHED IN THE INTEREST
OF NATURAL HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, - - - N. Y.

We request all of our readers to send us a description of their
Collecting Excursions, their Finds, or any items they may think
will be of interest to the readers of the COMPANION.

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BROCKPORT, MONROE COUNTY, N. Y.

RANDOM NOTES.

Jumbo, Barnum's famous ele-
phant, is dead. A taxidermist of
Rochester, N. Y., he believe, is to
mount the hide. The skeleton was
presented to the Smithsonian.

See our premiums for Nov.

Persons copying from us will
please give credit.

Mr. G. W. Barnhart, of Chambers-
burg, Ohio, recently exhibited at the
fair in Dayton, three pumpkins all
on one vine; the smallest weighing
83 pounds, and measuring five feet
five inches in circumference.

Weiderman's "BEILBLATTER" says
that a shark belonging to the genus
symnus is phosphorent on its whole
under surface, with a small black
strip on the back to be excepted.
All of the upper surface gives no
light.

An eagle died in Vienna, Austria,
last November, that has been kept
in confinement 114 years. It prob-
ably was a young bird when caught,
so that its age must have been not
far from 120. A record of the
eagle's condition was made from
year to year.

Herr Wieler, experimenting at
Tubingen, has discovered that the
growth of plants is more rapid un-
der diminished atmospheric pressure
—all other external conditions being
the same—than at normal pressure.
On the other hand, increasing the
pressure lessens the growth, the mini-
mum being reached at two or two
and one-half atmospheres.

One of the hardest woods in exis-
tence is that of the desert ironwood
tree, which grows in the dry washes
along the line of the Southern Pacific
Railroad. Its specific gravity is
nearly the same as that of lignum-
vitæ, and it has a black heart so
hard, when well seasoned, that it
will turn the edge of an axe, and can
scarcely be cut by a well-tempered
saw. In burning it gives an intense
heat.

A young naturalist without a natural history paper is far behind the times. Take our paper, it's the best.

If you wish to obtain some fine specimens for your collections give our advertisers a trial order.

Ye editor is thinking seriously of organizing an Agassiz Association chapter at this place.

The prospectus of the Standard Directory for 1886 is before us, and promises to be a grand success.

We had the first snow storm of the season at this place at 11:30 A. M., Oct. 6. Last year the first snow occurred at 10 o'clock A. M., Oct. 23.

Lyman H. Low, 838 Broadway, New York, has our thanks for a copy of his catalogue of U. S. and American Colonial Coins. The catalogue contains 41 pages and can be procured from him for 15 cents.

In an address before the Munich geographical society, Dr. Oscar Lenz has maintained that the dryness of the western Sahara is quite recent, and that it was caused by the felling of forests on the Ahaggar mountain range.

A white spot on the forehead of a horse generally goes with white feet. Hairless dogs are deficient in teeth. Long wings usually accompany long tail feathers. White cats with blue eyes are generally deaf. A sheep with numerous horns is likely to have long, coarse wool.

There are swans on the river Thames, in England, that are known to be 150 years old. For five centuries the Vintner's company there has kept a record of certain swans, and the ages of the specimens of this long-lived species of water-fowl are known to a day.

The astronomer royal for Scotland lately read a paper from Professor Crum Brown, on bright clouds on a dark night sky. He, Prof. Smyth said, had witnessed this strange phenomenon on April 18, 1862, and April 30, 1883. The air was for a few hours dry from a cause not very clear.

Ye editor, accompanied by a friend, went duck hunting to the lake a short time ago. Imagine his disappointment when upon arriving there he found that the shells he had loaded for his gun were all a size too large, and plenty of duck in sight. It is just as well, though, for if he could have used the shells there probably wouldn't have been a duck within fifty miles.

Would it not be a good plan for our young naturalists to arrange their collecting seasons something like this: In the spring collect botanical specimens and skins of birds and animals; in the summer, insects, eggs, nests and reptiles; in the fall, skeletons, larve, minerals and geological specimens, and in the winter to arrange, classify and study them, also to make exchanges.

At the fair held at this place the forepart of the month, our collection of butterflies and moths took first premium. The finest collection of curiosities on exhibition, in fact the finest we have ever seen, were those of Adolph May's. They were collected by himself in Australia, and consisted mostly of sea curiosities, among which we might mention numerous varieties of sea urchins, corals, sponges, sand shark's eggs, star fishes, sea horses, shells, etc. The collection took first premium.

The whale swims by striking the water up and down instead of laterally, with a finlike horizontal tail.

OUR AGENTS.

The following persons are authorized to receive subscriptions and advertisements for this paper. We will give a very liberal commission to persons who will act as our agents. Write for circulars and terms.

C. J. WALKER, Jr.,
14 Rutledge ave.,
CHARLESTON, S. C.

R. W. FORD,
BRISTOL, CONN.

THE HIPPOPOTAMUS.

(HIPPOPOTAMUS AMPHIBIUS).

One of the largest animals that now treads the surface of the earth is the hippopotamus or river horse of Africa. It belongs to the family called PACHYDERMATA, or in other words, thick skinned animals. In height it seldom exceeds five feet, owing to the shortness of the legs. Its body, however, is sometimes seventeen feet long. The skin of the hippopotamus is very thick and tough, but will not resist a rifle ball, as will the elephant's hide. Upon a close examination the skin is seen to be covered with numerous small sooty spots. These are the openings or pores, from which a thick, oily liquid exudes. This is to protect the animal from the water, which it does admirably. Wood, the naturalist, says that after he had patted one of these animals at the Zoological Garden, in London, he found he had completely ruined the pair of kid gloves he wore. Its skin is of a slatish or dark brown color, but the skin of a young animal is light pink. It is two inches thick and under this is a layer of fatty matter, considered by the natives a rare treat. The Dutch colonists smoke it like bacon, and call it "zee-koe speck," or "sea-

cow's bacon." It is also called "Cape of Good Hope bacon." The head is curiously formed, so that the nostrils, eyes and ears are on about the same level; thus it is enabled to breathe, see and hear without exposing more than an inch or so of its carcass. Its teeth are formed to suit its habits, as is everything else. The teeth on the lower jaw are pointed forward, almost horizontally. These, it is said, are used as crow-bars, to uproot the aquatic plants on which it lives. These teeth, to quote Wood's words, "are the mainstay of the dentist," as they remain white a long time, and more closely resembles the human teeth. It has four toes on each foot. The hippopotamus is a gregarious animal, living in herds of from five to twenty and sometimes in larger numbers. It frequents still portions of rivers where there is no current, so that it will not be swept away while in the land of dreams. It can remain under the surface for about half an hour, during which time it can be seen, if the water is clear enough, walking along the bottom of the river. This animal is of a gentle disposition, but when disturbed, wounded or provoked in any way, it rushes at its foe, and if he is in a boat, either crushes it in with his mouth or upsets it. It is valuable on account of the beautiful ivory obtained from its teeth, and also for its hide from which are made what is known as "cow hides."

J. ALLEN, JR.

Sand crabs of the Keyes of Florida are perfectly white and live in holes in the white coral sand, where they are hardly distinguishable, never leaving it to go among the mangroves a few feet away, for there, where the falling leaves have formed a dark background, their ghost-like forms would stand out in bold relief.

Readers, please contribute to these columns a little more freely, especially articles on ornithology.

WINTER BIRDS OF PRINCE EDWARD ISLAND.

BY FRANCIS BAIN.

Prince Edward Island, situated in the southern basin of the Gulf of St. Lawrence, possesses in some respects a climate peculiarly its own. Sheltered from the chilling breath of the Labrador Current by the elevated primary ridges of Nova Scotia and Cape Breton, it enjoys a summer season with a more elevated temperature, a purer atmosphere, a clearer sky, and more abounding sunshine on its rich, verdure-clad swells, than are to be found on the immediate Atlantic seaboard.

In winter, on the contrary, the shallow waters of the Gulf are soon covered with ice, sometimes extending unbroken as far as the Magdalens, and the temperature of the season is uniformly severe. Snow lies deep on the ground, and the rivers and bays for four months are firmly locked in ice. The atmosphere, however is pure and bracing, and free from the damp chilling mists of the ocean seaboard.

These conditions have an influence on our winter avifauna. Water birds which frequent bays and mouths of rivers are completely driven away. Only a few deep-sea fowl stay to glean a hardly living where the blue waves break among the parting floes. The depth of snow is unfavorable to members of the Finch tribe which, like the Tree Sparrow, seek their living from seeds on the ground. But the splendid deciduous forests which flourish on the fertile New Red Sandstone soil, afford food to some of the tribe dur-

ing the inclement season, which are not known to winter in the neighboring Provinces.

The Purple Finch frequently winters here. He does not frequent the abodes of men, but the lonely forest, where the domed summits of the great yellow birchs, *BETULA EXCELSA*, are thick-laden with strobiles, is his home. The stay-at-homes never see him. But on a keen, bright morning, when the gilded twigs are surging aloft in the frigid blue, from their loftiest tops rings out the glad, sweet carol to startle and charm the adventurous woodman.

Strange that the occurrence of a roving song bird in a district should be connected with the distribution of the ancient geological formations. But it is so. The soils of the New Red Sandstone formation sustain a class of plants affording more suitable food for the forest choresters than to be found in the Primary districts. The Connecticut Valley is well known as the winter home of many of our song birds. Western Nova Scotia has features of bird life distinct from the surrounding districts. And Prince Edward Island affords an oasis for the wintering of certain Fringillidæ in the midst of less fertile Primary lands.

The highly cultivated character of the country, with numerous stock yards and farmsteads, favors the wintering of birds. The Song Sparrow has been supposed not to winter north of Massachusetts. But among the stock yards of Prince Edward Island we often find the jovial songster tuning his pipe in midwinter as gaily as if he was in his old New England homestead.

TO BE CONTINUED.

From the AUK, Vol. II. No. 3, July, 1885.

MY BEST FINDS.

I would like to tell the readers of the COMPANION about one of my collecting trips, as it may interest you. Last spring, after a heavy rain, I, accompanied by my cousin, Geo. U. Cavines, started on a collecting tour. We first visited a rock bar, on Skunk river, two and a half miles north of La Hoyt, where we found several varieties of fossil shells. On going to the furthest end of the bar, my cousin exclaimed. "Oh! what a funny fossil." I examined it and found it to be a rare mollusk fossil. On leaving the rock bar we counted our finds. We had over fifty perfect mollusk fossils and five Indian arrow heads. We next visited what is known as Honey creek (a small creek emptying into Skunk river), which is one of the best places in Iowa for geological specimens. After going a short distance, I discovered something imbedded in the sand which resembled a tooth. I took it out and showed it to my cousin, when he exclaimed: "A mastadon tooth! Just like the one I saw in the Salem museum." Of course you can imagine my surprise and delight, for I always wished to possess a mastadon tooth. We found that day many minerals and curiosities. Before leaving the stream I saw a rock which resembled an agate. On examining it, it proved to be a fine large agate, which weighed about five pounds. This is also a fine stream for agates. I have often found from ten to fifteen pounds of agates after a heavy rain. Most of the agates are crystalized (the large one was not), and most of them are very large specimens. My cousin had found seven arrow heads and

two spear heads. We had also about fifty pounds of minerals, which made us a heavy load. We had found over twenty kinds of minerals; among them calcite, chalcedony, epidote, chalcedonized coral, hematite, hypersthene, iron ore, jasper, limonite, mica schist, petrified wood, pink, red and green feldspar, serpentine, and the following varieties of quartz: White, purple, milky, smoky, pink, glassy, crystalized and cluster, also several large balls of geodes of calcite, containing fine white crystals, and imbedded in the crystals were large chunks of pure lead ore. We bent our steps homeward with our heavy burdens, but well satisfied with our day's find.

JAMES C. JAY,
La Hoyt, Ia.

THE MOUSE.

An observant naturalist who has been investigating the peculiarities of the mouse, has discovered that that noisy little midnight prowler never walks, like other four-footed animals, by the alternate movement of the limbs, and is physically incapable of the deliberate complex group of muscular action seen in the co-ordination of the cat or dog. The eye, also, is inferior in its development to the eyes of other land vertebrates, and even to that of the fish, consisting of a mere spherical lens, inclosed in a sclerotic sac lined with black pigment; and the teeth are mere prolongations of the tips of the jaw-bones, not separate structures.

A mocking bird that whistles "Dixie" and the "Last Rose of Summer" is one of the curiosities of Atlanta, Ga.—KRIS KRINGLE.

TAXIDERMYY.

A serial on preparing and preserving animals, birds, reptiles, insects, etc., etc.

PART 4--BIPEDS.

STUFFING.

As far as our experience extends, we have always found birds easier to stuff than animals. The reason of it being so is this: Any default in the stuffing or sewing up of a bird can easily be corrected by adjusting, or what is termed by taxidermists, "picking out" of the feathers. Not so with animals, for if the skin of an animal is out of order the fur is also. There are various methods used in stuffing birds as well as other animals; but our object is to treat only on the simplest and easiest process. Procure two pieces of wire, of a size suitable to sustain the weight of the bird, the longest piece to be about three inches longer than the bird, measuring from the rump to the top of the head, and the other piece to be five inches longer than the distance between both of the bird's feet, measuring from the bottom of one foot across the body to the bottom of the opposite foot. File both wires to a point at each end. Now procure some cotton or tow, the later preferable, a pair of glass eyes, same size and color as those removed from the bird, and a smooth, round stick, about six inches long by one fourth of an inch thick. Place the skin on its back at its natural length. Lay the longest piece of wire on top of the skin, with one end extending about an inch below the rump, and mark it with a file at a point directly between the legs. Next take the wire and make a loop in it at the point marked just large enough to admit

the smaller wire being pushed through it. Place a layer of tow on the inside of the skin, filling the neck, skull and other parts from which any flesh has been removed. Now insert one end of the longest wire in the neck from the inside of the skin and push it upward until it protrudes an inch or so out of the top of the head, and then push the other end down through the skin and out at the roots of the tail. Insert the smaller wire in the bottom of one of the feet, and press it upward along the leg bone until it reaches the loop in the wire in the center of the body, pass it through this loop and continue it down the opposite leg and out at the bottom of the foot. Get some stout thread and, after winding a little tow around the leg bone and wire, bind the two tightly together. Repeat the operation on the opposite leg, and also bind the body and leg wires tightly together where the leg wire passes through the loop in the body wire. This done we will proceed with the stuffing. Place some tow or cotton inside of the skin, and push it in place with the stick above mentioned, and continue adding more tow until the breast, neck and other parts are properly filled out, then draw the skin gently together and sew it up. It is not necessary to describe the process of mounting as we described that under the head of animals so thoroughly that any of our bright young readers could arrange the instructions so as to make them apply to bipeds instead of quadrupeds. After the bird has been mounted and the feathers properly arranged, place the wings in their natural position and fasten them there by inserting two

or three pins in them at the shoulder joints. After the bird has been placed in the desired attitude it should be carefully wound around with a strip of cloth one-half inch wide and sufficiently long to wind the entire bird, and should remain on until the bird is entirely dry, thus holding the feathers in their natural position. Now if any readers do not understand this let them write us, inclosing a stamp, and we will endeavor to explain.

TO BE CONTINUED.

THE ORIGIN OF GOLD.

The question of the origin of native gold always has been and is quite likely to remain a disputed question among geologists and mineralogists. Prof. J. S. Newberry now contests the theory that the grains and nuggets found in placers are formed by precipitation from chemical solution. He holds that geology teaches, in regard to the genesis and distribution of this precious metal, that it exists in the oldest known rocks, and has been thence distributed through all the strata derived from them; that in the metamorphosis of these derived rocks it has been concentrated into segregated quartz veins by some process not yet understood; that is, it is a constituent of fissure veins of all geological ages, where it has been deposited from hot chemical solutions, which have reached deeply buried rocks of various kinds, gathering from them gold with other metallic minerals, and that gold has been accumulated through mechanical agents in placer deposits by the erosion of strata containing aurifer-

ous veins. According to the report of Special Agent Clarence King, of the census, based upon information directly from the producers of bullion, a comparison of the annual output of different States shows that the United States produce 33.13 per cent. of the gold yield of the whole world, 50.59 per cent. of the silver, and 40.91 per cent. of the total. Of the aggregate supply of the precious metals, North America furnishes 55.78 per cent.

CORRESPONDENCE.

This Column is open free to yearly subscribers only.

To R. D. G., New Sharon, Ia.—The Summer Yellowbird, or Yellow Warbler as it is commonly called, lays from four to five eggs of a grayish-white ground color, spotted and blotched with brown. These spots, or rather blotches are quite thick at the larger end of the egg. The size of the eggs average about .65x.50. Fresh sets of the eggs of this bird can be obtained from May 20th to June 15th. The nests are usually placed in young saplings, six to twelve feet from the ground. We will give a more complete description sometime in the near future.

J. A., Jr., Lake View, Ill.—Will endeavor to answer your question in the next number.

Why are not our readers a little more inquisitive? We wish they were, as we wish to make this department one of the features of our paper.

Persons wishing a good collection of curiosities should purchase of Bennett & Deau.



Conducted by "P" PER PLEX.

ANSWERS.

The person winning the prize for the best article on Natural History will be announced in the next issue.


I understand you undertake to overthrow my understanding.

Won by Mattie C. Garrett, Steubenville, O., and C. J. Walker, Charleston, S. C. Both answers were mailed the same day, the collection will therefore be divided.

The largest list of words made from the name of this paper is 1016. Charlotte S. Dickinson, Commonwealth, Wis., winning the prize.

As no correct answers were received to other puzzles we do not publish the answers. They can be obtained by sending a 2-cent stamp to pay postage.

PUZZLES.

 Open to subscribers only. Subscriptions may be sent in with the answers, however.

For the first correct answer to the following puzzle we will send a fine 50 cent collection of curiosities.

1. Behead a mineral and leave soft scrapings of cloth. Behead a mineral and leave a way of passage. Behead a mineral twice and leave to cheat. Behead a mineral and leave the opposite of young. Behead a mineral and leave to corrode. Behead a mineral and leave a quadruped. Behead a mineral twice, then prefix a letter and leave it angry.

We will give a good book on taxonomy for the first complete list of correct answers to the following questions.

2. How do flies walk on a smooth surface?

What causes wind?

How did the sea become salt?

Does a fish receive oxygen from the water or from the air in the

water?

When a whale "blows" what does it eject from its body?

How much more powerful is sunlight than the most powerful electric light.

3. We will give a copy of Davie's Egg Check List for the best article on Oology.

4. We will give a dollar collection of curiosities for the largest list of subscriptions sent us in Nov. To be not less than five.

5. OPEN TO ALL, whether subscribers or not. We will send the COMPANION one year to the person who will send us the largest list of words made from the letters in word Oology.

Professor Fritsch has, by his studies upon the development of the electric organs of the torpedo, proved that they are developed from the outer gill-muscles of the fifth gill-arch. These, which in rays and sharks form the extraordinary powerful muscle of the lower jaw, are absent in the torpedo, while the electric organs are developed in their place. In the first stage of its development the structure of the electric organ is similar to that of embryonic muscle, as distinct longitudinal striae and traces of transverse striation are evident.

Whoop, Big Injun! The bloody wretches have murdered thousands of people in this section of the U. S. The weapons these savages left behind are for sale by Wigglesworth.

Woodpeckers have been known to lay 71 eggs in 73 days.

CUTS bought, sold or exchanged.

JUST LOOK !

THE
Naturalists' Companion
ONE YEAR FOR ONLY
-25 CENTS.-

On account of the large amount of job work on hand, we cannot offer premiums for the month of November, but instead have reduced our subscription rate for the month to the price of 25 cents. Why, just think of it, reader, you spend as much as that for candy and such other truck every month, and besides when you buy such stuff it disappears within a half an hour and then you are no better off than you were before you bought it, whereas if you would send us the trifling sum of 25 cents you would have something coming the whole year. Something to instruct and interest you all these long winter evenings. Subscribe immediately, for you will not receive another paper until we have your name on our list. Reader, show this paper to your young friend naturalists that they may avail themselves of the opportunity to get so good a paper for so small an amount of money, they will thank you for it. Please do not send us any more of those infernal postage stamps, we have enough of them already to stock a freight house. Just place a 25 cent piece in the center of your letter and inclose in a well-directed envelope and we will guarantee its safe arrival, or better still send by postal note. For the month of November we will send two yearly subscriptions for 45 cents; three subs. for 65 cents

or five subs. for one dollar. Let us see the name of every one of the 2000 young people who receive a copy of this issue on our sub. list at the end of the month.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

J. UNGER, 726 O'Farrell st., San Francisco, Cal.—Sulphur from Mt. Aetna, starfish, hematite, black and green slag and silver ore for minerals, fossils and curiosities. Only accepted offers answered.

JAMES G. JAY, La Hoyt, Iowa.—Rare minerals, including moss agates, opal, etc., stamps, fossils, Indian relics, fossil shark teeth, sea urchins, sand dollars, star fish, sea shells, skate eggs, post-marks, etc., for U. S. and foreign stamps, match, medicine and revenue stamps, post-cards, etc.

THADDEUS VAN HOUTEN, Brockport, N. Y.—A pair of Acme club skates, 10½, nickel plated, nearly new, and a four jointed fishing rod and tackle for the best offer in coins.

On account of the large number of excellent articles on hand we were obliged to omit the illustrations in this issue, they will be continued however in our next.

Have your name inserted in the Agents Name Directory, and by so doing receive free samples and papers from all over the world.

See Stewart's advertisement and then send him the dirt-cheap price he asks for those excellent relics.

THE NATURALISTS' COMPANION.

Vol. 1.

BROCKPORT, N. Y., NOVEMBER, 1885.

No. 5.

UNCLE EPH'S PHILOSOPHY.

"You can't tell by de cropins,
Wots away down in de rocks ;'
An' you can't tell nebber wot to buy
Among de fancy stocks.'
'Dis yerf has in de fishurs,
Bases, long with silver glances ;'
An' 'de stock de greeney's go fur
Am de riskies' sort ob chances."

—ARIZONA SILVER BELT.

THE AMERICAN LONG-EARED OWL.

ASIO AMERICANUS.

This bird is very evenly distributed over the United States, and is one of the most common of the owls. It subsists chiefly on small quadrupeds and birds, being an especial enemy of the field mouse and pocket gopher. Arriving in the northern states early in the spring, it begins to nest about the first of May, and the usual set of four or five eggs are generally deposited in a deserted nest of some hawk or owl by the fifteenth of the month. The eggs are oval, nearly round and of that peculiar glossy white color always noticed in the eggs of the smaller owls. They measure about 1.50 by 1.22 inches or somewhat larger. More often the number is five. The eggs of this species may be found in this latitude from the 10th to the 15th of May, according to the lateness of the spring. But here, in southern Minnesota, the young are almost always half grown by the

first of April. The young leave the nest as soon as they are able to fly well and in a few days can take care of themselves. They are rather solitary as a general thing, but in one instance the writer found four occupied nests within fifty feet of each other. In this case the young were just beginning to fly, and the little grove was full of them. The parents are ever present and use various stratagems to delude the intruder, sometimes fluttering about as if one wing were broken and then, failing in that, will perch over the intruder, hissing barking and hooting in a great variety of ways. This little owl is more common than may be supposed, for, nesting in dark groves and heavy timber bottoms, little is seen of it except by students of nature. It makes a very nice pet if taken when young. The adult female is larger than the male, as it is in the case of all birds of prey, measuring about fourteen inches in length. The general color is light brown; underparts white with traverse bands of very light brown. In the male the color is considerably darker than in the female. The "ears" are tufts of soft feathers about one and one-half or two inches in length. They are light brown in the female but almost black in the adult male.

GEO. H. SELOVER,
Lake City, Minn.

Advertisers.—We will circulate about 5000 copies next issue.

WINTER BIRDS OF PRINCE EDWARD ISLAND.

BY FRANCIS BAIN.

In the latter part of October the Snow Buntings come here. It is worthy of remark that they appear in New Brunswick considerably earlier, indicating that they arrive from the north by that way instead of by direct flight across the Gulf. At first they do not frequent the cultivated districts, but may be seen foraging along the shores and in deserted grainfields. In December, when snow and ice bury up their food in the wilds, they come about the grain stacks and farm yards in large, white flocks, whirling, like snow drifts in the keen winter air. They are very fond of oats, for which this island is famous. They always shell the grain before devouring it, using only the farinaceous kernel.

It is rare to hear Snow Buntings sing, but on a bright morning in March, ensconced in a sheltered nook, I have heard them sing a low, sweet song, resembling the Linnet's in general outline, but much less strong, full, and rapid.

The Redpolls arrive the first week in November, when the ripened and gilded cloak is just reft from the forest boughs. Then we see little of them, but occasionally hear their gentle clitter as they pass back to the groves of great yellow birches, on the seeds of which they principally feed. Free and happy is their life in the wilderness now, as you may witness if you watch a group of them whispering and calling

sportively as they rifle the seeds from the crowded strobiles of a giant *EXCELSA*. But when winter fully comes they are driven from the forest's summit, evidently suffering from the cold. They then crowd close in shivering flocks of fifty or more, and come and feed on hay stacks and on the seeds of goosefoot, polygonum, and other weeds about the gardens. I have seen the hunger-driven flock settle down on loads of hay exposed for sale in the city market. Yellow birchs are our only deciduous forest trees which carry a quantity of seeds through the winter, and it is this circumstance which makes them so important for the support of the winter flocks.

The Goldfinches leave the last of October, the last individuals evidently suffering during cold storms, and their place in winter is taken by a few wild, bounding Pine Goldfinches, whose slim voices sound sweet notes round the dark spires of ancient spruces where the White-winged Crossbills feed. We sometimes have large flocks of Red Crossbills, but their coming is very uncertain. They were in force in December, 1877, and in January 1884. Spruce seeds were abundant both these seasons.

Pine Grosbeaks come in November, but their numbers are uncertain. When coniferous seeds are plenty, flocks of fifty bright-plumed beauties, with their gentle, unsuspecting, wilderness-ways and soft voices, come frequently about the spruce groves. But when these are scarce, as they are this season, it is rare to hear the call of a solitary wanderer in the most unfrequented forest scene. But Grosbeaks are

not dependent alone on a precarious supply of cone-borne seeds for a living. They feed much on the buds of the trees, and will even go to the shores for a meal, like the Buntings and Robins.

In mid-winter they retire to the shelter of the deep, coniferious forests. On a sunny morning, when the fir drapery flashes with crystals, the group of forest wayfarers may be found in their sheltered home, keeping each other company with quiet flocking calls, a male constantly breaking into a delightful Linnet-like song, with some peculiarly rich flute-notes of his own. In such circumstances they do not mount the blast-swept summits of the trees but content themselves with foraging on the lower sheltered boughs.

All these winter visitants, except Snow Buntings, are irregular and uncertain in their appearances here. During mild seasons we have them in numbers, but cold and stormy winters drive them to districts where food is more easily obtained. But Grosbeaks and Crossbills are never in numbers unless coniferious seeds are abundant.

But few Tree Sparrows winter here, although they are abundant in November. Black Snowbirds are almost equally rare, and it is only now and then that a Robin favors us with his presence during the dreary months. One or two will sometimes stay where the berries of the mountain ash (*SORBUS AMERICANA*) are plenty.

TO BE CONTINUED.

From the AUK, Vol. II, No. 3, July, 1885.

G. C. Whitney, Belvidere, Ills., has our thanks for a copy of his Collector's Guide.

The Earth Older than the Sun.

M. Faye, a French astronomer, maintains that the earth is older than the sun. All of the planets from Mercury to Neptune were formed first. The sun was a nebular mass far outside their orbits. Subsequently it passed over to the center of the planetary system, and collected there into the grand luminary which we know. Uranus and Neptune were then evolved from the scattering fragments, having satellites with retrograde motion. In the present period life may have existed first in the northern regions, as the fauna and flora found there indicate. Then there was no arctic winters, the locomotion of the nebulous mass being such as to radiate most heat upon the poles and that part of the earth's surface so sadly neglected in our present calorific arrangement.

A French physiologist, Dr. Regnard, is endeavoring to study marine animals under their natural condition by an apparatus designed by Cailletet, enabling him to watch the creatures under any pressure up to that of 650 atmospheres, which corresponds to that of the sea at the greatest depths at which dredgings have been made—about four miles.

Two microscopists, Dr. Nussbaum and Dr. Gruber, have artificially multiplied infusoria by cutting them in halves, each half becoming a perfectly developed animal.

Read carefully every advertisement in this magazine. You will surely find something to complete your collection at a trifling cost.

The Naturalists' Companion

AN ILLUSTRATED MONTHLY
PUBLISHED IN THE INTEREST
OF NATURAL HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, - - - N. Y.

We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

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CHARLES P. GUELF,

BROCKPORT, MONROE COUNTY, N. Y.

RANDOM NOTES.

A lemon weighing 4 pounds and 13 ounces was recently picked at Panasoffkee, Fla.

What do you think of the articles in this issue, reader.

Read every advertisement.

H. M. Downs has our thanks for a fac-simile of Ben Franklin's first paper.

We have just been presented with a fine specimen of garnet by Mr. Warren Carter, which shows the very fine quality of his goods.

Thomas Spencer contends that suboxide of iron, and nothing else, is the prime agent in the origin and maintenance of life on the earth.

Our agent, R. W. Ford, Bristol, Conn., has presented us with a fine rubber stamp and outfit, which for neatness of design and evenness of work can't be beat. See "ad."


Collectors, look out for the advertisement of E. M. Haight, of Riverside, Cal., which will appear in the next issue. He is one of the most extensive dealers in curiosities in America. Prices away down.

It is with pleasure that we announce the advertisement of Mr. J. S. Jefferis. We have done considerable dealing with this gentleman, and find him perfectly reliable. A number of his fine specimens adorn our collection. Notice his "ad."

Ernest Ostrom, of Danbury, Ia., informs us that a woodpecker commonly called the yellow hammer or yellow-winged woodpecker [yellow shafted flicker] laid 24 eggs in one month in a nest near that place. Six of these eggs are now in his possession.

We have received a fine flint arrow head, which with pleasure we add to our extensive collection, from Joseph Wigglesworth, an archaeologist and dealer of Wilmington, Del. One of these arrowheads would be a very valuable addition to any collection. See advertisement.

Advertise in this magazine.

 Printers—We will sell 40 lbs of this small pica, tied up, for \$12.

Don't fail to have your name entered in the Standard Directory.

The Alert, Bay City, Mich., is the finest little paper of the age.

Oscar H. Spray, La Hoyt, Ia., has our thanks for a sample of calcite.

Two monkeys in the zoological garden, Philadelphia, have been poked to death by visitors.

No collector should fail to procure one of those fern impressions of T. F. McNair, Hazleton, Pa.

All desirous of making some fine exchanges should send for a copy of the Exchange and Mart.

Persons in need of useful receipts in the natural history line should view the "ad." of the Supply Co.

Don't fail to procure some of those excellent specimens offered by A. N. Fuller, Lawrence, Kan.

Peat bogs cover about one-seventh of the surface of Ireland. Some of these bogs are supposed to represent 20,000 years growth.

Rings, or concentric ligneous layers would seem to be a very uncertain indication of the age of trees. In Mexico some trees known to be but 22 years old were found with 280 rings.

The late Dr Rolleston said that the guinea-pig closely resembles birds, and especially those of the charming order of the fringillidae. Like a finch, it is never still for a moment. In antiquated volumes of natural history, it enjoys the second name of the Restless Cavy. Just as the fringillidae are always chattering, so the guinea-pig is always uttering its own little cries.

Subscribe instantly !!!

Mr. Wigglesworth kindly volunteered his assistance in the editing of this magazine by conducting a department on Archaeology, a very instructive and interesting science in regard to the natural history of man. The department will be continued just as long as our readers take an interest in it, which we hope they will do. We would like our readers, when writing us, to express their opinion in regard to it.

How do you like the new serial story? The writer promises to make it very interesting in the future numbers. The numerous articles written by him from time to time for this paper were very fine, and among the best the magazine contained. We trust he will make this article both instructing and interesting. The story is strictly true, being a description of a voyage which he took among the Adirondacks in a canvass canoe.

Bennett & Dean, the great curiosity dealers, have given us the contract to print them a fine twelve-page catalogue. It will be issued from the press about the same time as the COMPANION. Every collector should send for a copy. To illustrate the cheapness of the specimens in their price-list, we quote the following: Alligator teeth, 5c., skate eggs, 8c., electric light carbons, 10c., horn nuts; 10c., sand crabs, 10c., sand dollars, 10c., star fish, 5c., sea urchins, 10c., sea gopher, 5c., sea beans, 4c., fern impressions on coal, 5c., etc., etc. The above sent post-paid on receipt of price. We have just obtained a FINE collection of natural history specimens of these gentlemen and would strongly recommend them to our readers.



PROF. LOUIS JOHN RUDOLF AGASSIZ.

AGASSIZ, the greatest of modern naturalists, was born in Motiers, in the canton of Friburg, Switzerland, on the 28th of May, 1807. His early education was received at home and in the public schools; later he studied at the universities of Zurich, Heidelberg and Munich. In 1833, after the death of Cuvier, he was appointed professor at Neufchatel, where he remained for thirteen years. The extensive and valuable zoological museum in the college there was founded and largely collected by him. While in Munich he became acquainted with Martius and Spix, the well-known travelers in Brazil; and when Spix died his collection of 116 species of fish collected in Brazil was left in the care of Agassiz. This led him to study ichthyology more closely. Agassiz next undertook a systematic arrangement of the fresh-water fishes found in Central Europe, and at the same time devoted his attention to the fossil remains of fishes. During several visits to England, Agassiz made himself well acquainted with the collections of fossils in that country; and in 1844 published a monogram on fossil fishes found in the old red sandstone of the Devonian system. Agassiz next turned his attention to the mollusca. His works on Glaciers excited great inter-

est. In 1846 he came to this country, where he was appointed to a professorship in Harvard College, in Boston. In "Outlines of Comparative Physiology" Agassiz upholds the doctrine of the successive creation of higher organized beings on the earth. "An Essay on Classification," by Agassiz, was published in London, in 1859; and a "Journey in Brazil," in 1868. During the latter part of these years he was appointed a non-resident professor and lecturer in the Cornell University, Ithaca, N. Y., and along with Count Portales, was intrusted with the dredging operations in the investigation of the Gulf Stream, undertaken by the American Government in 1871. His last work was the establishment of a School of Natural History, on the island of Penikese, presented to him by Mr. John Anderson. He died December 14th, 1873.

TO PERSONS INTENDING TO SUBSCRIBE!

In our last issue we stated that on account of the large amount of job work on hand we could not offer premiums, not having the time to send them, so we reduced our subscription rate for this month to 25 cents, hoping by this issue to be able to attend to the premiums again; but as we go to press the job work is thicker than it was a month ago. We have, therefore, decided to give our readers the advantage of it, and offer this paper one year, to persons subscribing during the month of December, **For Only 25 Cents**, making it the cheapest Natural History paper published. Remember, you will not receive another copy until you have sent us that immense fortune of 25 cents for a year's subscription.

TAXIDERMISTRY.

A serial on preparing and preserving animals, birds, reptiles, insects, etc., etc.

FROGS AND TOADS.

SKINNING.—The mouth is opened, and the first vertebra of the neck is cut. The whole inside of the mouth is cut out with scissors. The two jaws are next raised up, and the skin is pushed back with the fingers

of the right hand; while the body is drawn back in a contrary direction with the other hand, and the whole body is then drawn out at the mouth. The legs are then returned to their proper place.

Lampreys, eels, and fish of similar form, may be skinned in the same manner as are frogs and toads, by drawing the body through the mouth.

STUFFING.—The simplest method of stuffing frogs and toads is with sand. A small funnel is placed into the mouth, and well-dried sand poured in. When full, a small piece of cotton is pushed into the throat, with some of the cement, to keep the sand from escaping on moving the animal. The frog is then placed on a board, and in an attitude. When quite dry, give it a coat of varnish. When this has perfectly dried, very small preforations are made under the abdomen with the point of a needle, and the sand allowed to escape, leaving the body of its natural form. These animals are liable to change of color from drying and should, therefore, be painted with the varnish to their natural hues. There is less difficulty with toads in this respect, as they are usually of a brown color, and not liable to much change. They may be perfectly preserved in spirits. Mr. Burchell, in his four years' journey through Africa, glued the skins of the smaller serpents perfectly flat on paper, which preserved the size of the animal, and the skin retained all the beauty of life.

ARSENICAL SOAP.

Arsenic, in powder,.....2 pounds,
Camphor,.....5 ounces,
White Soap,.....2 pounds,

Salt of Tartar.....12 ounces,
Powdered Lime.....4 ounces.

The soap must be cut in small and very thin slices, put into a crucible with a small quantity of water, and held over a gentle fire, and frequently stirred with a piece of wood of any kind. When it is properly melted, the powdered lime and salt-of-tartar must then be added, and thoroughly mixed. It must now be taken off the fire, the arsenic added gently, and stirred. The camphor must be reduced into a powder, by beating it in a mortar, with the addition of a little spirits-of-wine. The camphor must then be added, and the composition well mixed, while off the fire. It may be again placed on the fire, to assist in making the ingredients incorporate properly, but not much heated, as the camphor will very rapidly escape. It may now be poured into glazed earthen pots, and allowed to cool, after which a piece of paper and sheep leather is placed over the top, and set aside for use. The composition is about the thickness of ordinary flour paste. When it is necessary to use the soap, put as much as will answer the purpose into a preserve-pot, and add to it about an equal proportion of water. It should be kept as close as possible, and used with caution, as it is a deadly poison.

We take the above from Haney's Taxidermist's Manual, price 50 cts.

On account of sickness we were unable to issue the paper on time this month, but will try to catch up by the December issue.

☞ We will sell Agassiz's cut for \$1.50, or will exchange it as well as a few other cuts, for type, cuts, etc.

We have a large amount of valuable articles, kindly contributed by our readers, although crowded out of this number will try to appear in the next.

*A NATURALIST
CANOEING 200 MILES
IN THE ADIRONDACKS.*

BY FALCON.

CHAPTER I.

The vast region of forest, mountains and lakes, lying in northern New York, and known as the Adirondack Wilderness, is the most beautiful, and at the same time most lonely and uninhabited spot east of the Rocky Mountains. The scenery far excels that of the Catskills in wildness and beauty, and presents to the naturalist an inexhaustible supply of material for study. The panther may yet be found, and deer, wild cats and bears are tolerably common. Fish are abundant, and birds of many species may be seen. The deer are being rapidly killed off, and unless the State puts a stop to it, they will be exterminated in a few years. The white pine, cedar, hemlock and spruce form the majority of trees, and are very fragrant. The air is always cool in summer, and altogether the climate is one of the healthiest in the country. Cooper gives a splendid description of this region in his "Last of the Mohicans." Mount Marcy (or Tawhasus) is the highest peak in this range, being over a mile high. On Long Lake the remains are yet to be seen of an old military road, built during the French and Indian war, between Albany and Inebec. So much for description. Now for the trip.

CHAPTER II.

"Well, Will, are you already?"
"Yes." "Drive on then." These

words were spoken as we left the house, armed and equipped for a three weeks sojourn in the Adirondacks. The station was only a mile distant, and that all down hill, so we were soon there waiting for the train. We expected to reach Schenectady that night, and the next day would take us into the woods. The party consisted of Professor Johnson and myself. The Professor had been among the Adirondacks many times before, but this was my first trip, and I was of course in a great hurry to be off. The train arrived at last, we got aboard, and were whirled away toward the north. No noteworthy incident occurred during the trip to Schenectady, which we reached as the sun was setting, and immediately got our supper and went to bed, as we had to arise early the next morning in order to catch the train. Leaving Schenectady at six o'clock we passed through Saratoga, and noon found us at North Creek, the termination of the Adirondack railroad. From this station we were to take a stage ride for thirty miles over the mountains to Blue Mountain Lake. As we stepped from the train it began to sprinkle, and then to rain, much to our disgust. We then got inside the big tally-ho coach, which was already crowded. "Get up!" shouts the driver, as he cracks his long whip. We start, and go up, up to the top of a hill, then plunge down into the valley on the other side, the old coach swaying and rocking like a ship in rough weather. When we reached Cedar River, where there is a small hotel, we stopped to water the horses, and, as it had stopped raining, I decided to sit up on the seat with the driver, and get a

glimpse of the country through which we were passing. I accordingly did so, and when we started again I was occupying a seat on top of the coach. The Professor told me that I had better come inside, but to no avail, as I could see no reason for such a warning. We had gone about a mile safely, and I was enjoying the never-ending panorama of lakes, mountains and valleys, when it began to rain again. About that time I wanted to go inside but that was impossible as the coach was crowded before, and a new passenger had been taken in at Cedar River, leaving no room for me. How it did rain! I had on nothing but a thin gauzmer, and that was next to no protection, therefore, in about five minutes I was wet to the skin. And that was not all; I had to ride twenty-five miles in that pouring rain, till at last we arrived at the Blue Mountain House, our destination. I got off my wet clothes as soon as possible, and went to bed to dream of nothing but water.

TO BE CONTINUED.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Del., to whom all articles pertaining to the subject should be addressed.

THE AZTECS AND TOLTECS.

Besides the Indians and Mound-builders, the Archæologist recognizes another aboriginal race of America. From symbolical representations or hieroglyphics found in Mexico, they are computed to have consisted of several tribes, the principal ones of which were the Aztecs

and Toltecs. Of these the Toltecs were the oldest and the Aztecs the most numerous. The hieroglyphics represents that about the year 475 of the Christian era, the Toltecs were expelled from their own country, called Tollan, situated far to the north of Mexico, and for some time after that they led a migratory and wandering life; but at the expiration of 100 years, they reached a place about fifty miles to the eastward of the city of Mexico, where they remained twenty years. Thence they proceeded a short distance westward where they founded a city, called from the name of their original country, Tollan. The Toltecs during their wanderings were conducted by chiefs; but after their final settlement, their government was changed to a monarchy, which lasted nearly four centuries. At the expiration of this time they had increased very considerably in numbers, and had built many cities; but when in the height of their prosperity, almost the whole nation was destroyed by famine and pestilence.

The Aztecs are not represented to have their country, (a great distance north of the Gulf of California) until about the year 1160, when they did so by the command of one of their deities. After wandering fifty-six years, they arrived at the city of Zumpango, in the valley of Mexico. During their journey they are supposed to have stopped some time on the banks of the river Gila, an eastern branch of the Colorado, where may still be seen ruins of massive buildings which they are said to have constructed. Thence they proceeded until they came to a place, now known by the name of Casa Grande, on account of a very large

building still extant there at the time of the Spanish conquest, and universally attributed to the Aztecs by the traditions of the country. From here they resumed their wanderings until, finally, about the year 1216 they arrived in the valley of Mexico. Here they were at first well received, but they were enslaved by a neighboring prince, who claimed the territory and was unwilling to have them remain without paying tribute. They were finally, however, released from bondage, when they resumed their wanderings which they continued until about the year 1325, when they came to a place on the borders of a lake, where the eagle that had guided them in their journey died. This was the sign given them by their oracle, designating the place they were finally to settle; and as they had taken possession, they built a city, called Mexico, after Mexitli the Aztec god of war. Relics of these tribes are found in Arizona and neighboring states. They are extremely rare however.

The Exchange, Adrian, Mich., is a handsome and well edited paper.

Bones have been proven to quickly dissolve in sea-water. They are consequently seldom obtained during ocean dredgings, although teeth, which resist the water indefinitely, are often brought up.

Prof. Herbert Smith and his party of naturalists from Baltimore, who have been for some years in Brazil, have made a collection of 600,000 specimens of insects, birds and animals in eighteen provinces of the empire. They will explore the valley of the Amazon this Fall.

A Simple Egg Measure.

There is one article needed by every oologist which, so far as I can ascertain, has never been supplied—that is a measure for eggs. My own means for measuring, until recently, was to run a pin in as far as it would go and then measure the pin, but I found this method broke the eggs too often. I then struck upon the following plan:

Take a small board (four inches square will be plenty large enough).

.	—1½; 1.12
.	—1; 1.
.	—¾; .87
.	—¾; .75
.	—⅝; .62
.	—½; .50
.	—⅜; .37
.	—¼; .25

Draw a line across the centre, and at even distances from this line place pins or pegs, as shown in the diagram. To measure, place your egg length-wise upon the centre of this line and run it along until the sides hit against the pins: the figures at the pins which are hit tell the width of the egg. Then repeat with the egg sidewise which will give the length.—AMATEUR OBSERVER.

Why is it that we never receive a copy of the Hoosier Mineralogist and Archaeologist? Brother Thompson, have you made a mistake in our address, or don't you wish to exchange?

ADVERTISE IN THIS PAPER!

CORRESPONDENCE.

This Column is open free to yearly subscribers only.

C. J. W., Summerville, N. C.—We can furnish you with a set of taxidermists' instruments for \$3.00. It is not necessary to go to the expense of buying a set, for all that is really necessary is a file, a pair of scissors, cutting pliers to cut wire with, pincers or small hand-vice to hold wire while filing it to a point, a button-hook and a scalpel, which may be made by breaking the blade of a very light jack-knife one inch from the handle and then filing it as shown on page 10, No. 1 of this paper. or we can furnish you with a good one for 60 cents. For arsenical soap see "Taxidermy," this issue. The best method for polishing shells is to put the shell in a pan of cold water, with a quantity of quicklime, and boil it from two to five hours, according to the thickness of the epidermis. The shell afterward must be gradually cooled and some strong acid applied to the epidermis, when it will easily peel off. The shell is afterward polished with rotten-stone and oil, put on a piece of chamois leather. After the operation of polishing and washing with acids, a little sweet oil should be rubbed over to bring out the colors and destroy the influence of the acid.

J. S. T., Adrian, Mich.—We have no knowledge as to when egg collecting began or the origin of the blow-pipe.

We have numerous other inquiries which we will endeavor to answer in the December number.

THE OSTRICH.

(AVIS STRUTHIO).

The ostrich is a bird which is only found in the sandy deserts of Africa and Arabia, where it roams about in small flocks, feeding upon various grasses, seeds, and other vegetable matter. It is the largest bird now existing, being upwards of six feet in height, and weighing considerably more than two hundred pounds. It has a long neck, small head, and large, bold eyes. Its legs

are long and so powerful that it is capable not only of running swiftly but of striking such a blow with its foot that leopards and other beasts of prey find it too formidable a creature to be easily attacked. Its wings are so short that they are useless for flight, but are of considerable assistance to the bird when hard pressed by pursuers. At such times it stretches them out, flapping them strongly, and thus greatly increases its speed. The wing of an adult bird contains twenty-four long, handsome feathers. The plumage of the male bird is a glossy black, and that of the female, gray with a sprinkling of white feathers. The nest of the ostrich is a mere hole scooped in the sand. A large number of eggs are deposited here, the nest being the joint property of several females. Except in the very hottest regions the ostrich does not leave her eggs to be hatched entirely by the heat of the sun; she sits upon them by night, at which time the atmosphere would be too cold for them; but they are left to the sun's heat during the day. The eggs, which weigh about three pounds, are somewhat valuable as an article of food, and the thick, strong shell is used for various purposes, principally as a water-vessel.

MATTIE C. GARRETT,
Steubenville, O.

The Hawkeye Observer and this paper one year for 50 cents.

The oldest bank-note in existence in Europe is in the St. Petersburg museum. It was issued in 1399 B. C., by the Chinese Government. It is said that bank-notes were used in China at least as early as 2500 B. C.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

W. M. SACKETT, Meadville, Pa.—Fine insects, birds' eggs and sea shells for curiosities or the same.

C. J. WALKER, Summerville, S. C.—Curiosities for minerals and same. One piece marl for a V nickel of 1884.

G. H. SELOVER, Lake City, Minn.—Good *sets* of eggs, No. 275, 7 and 261, wanted at once. Good exchange given in single eggs and sets with data.

PHILIP SEIBEL, 735 O'Farrell St., San Francisco, Cal.—A specimen of black or green slag for other minerals. Previous correspondence not necessary.

W. H. PLANK, Box 532, Wyandotte, Kan.—Argillite, selenite, steatite, dolomite, etc., for good minerals. Indian pottery for stamps. Write first. Correspondence desired with boys and girls who are interested in philately and mineralogy.

WALDO WADE, New Bedford, Mass.—40 numbers of Harpers' Young People for a calliope bicycle whistle. 120 numbers of Youth's Companion, 20 numbers Golden Days and the Naturalists' Companion to date, for a bicycle bundle carrier.

ARTHUR NEVILL, Breslau, N. Y.—20 numbers Harpers' Bazar, 11 numbers Popular Science Monthly, 35 numbers of different magazines, a scroll saw, hand-power, steel frame, 29 patterns, sawblades, etc., in lots as shown for natural history specimens. Must be in good condition, as mine are.

OSCAR H. SPRAY, La Hoyt, Ia.—Rare minerals, fossils, Indian relics, skate's eggs, fossil shark teeth, key hole sea urchins, sand dollars, and all kinds of sea curiosities for stamps of any kind, or for entire envelopes, foreign post-cards and Confederate bills.

Try Hammond's Mucilage. It's boss, especially for naturalists use.

W. S. Smith, of Richmond, Kan., captures the prize for the greatest number of words made from the letters in the word Oology.

OUR AGENTS.

The following persons are authorized to receive subscriptions and advertisements for this paper. We will give a very liberal commission to persons who will act as our agents. Write for circulars and terms.

J. M. Beers, 126 E. Water St., Elmira, N. Y., C. J. Walker, Jr., Summerville, N. C., R. W. Ford, Bristol, Conn., Arthur F. Clark, 414 Orleans St., Keokuk, Iowa.

The Belvidere Herald is A No. 1. Be sure and write us for an estimate on job printing.

E. J. Davis, Rochester, N. Y., has our thanks for a number of amateur papers.

We have suspended our puzzle department; think we can put the space to better use.

The Magnet is without doubt the brightest little paper in the 'dom, and we wish it all manner of success.

Boys' Weekly, Adrian, Mich., should be read by every youth in America. It is very well edited.

We award the prize for the best article in the November number to Falcon, Plymouth, Conn., for his article on "Blue Prints."

A nearly perfect skeleton of the mosasaurus was recently discovered in a quarry near Mons, in the Province of Hainaut, Belgium. It has the extraordinary length of fifty-five feet nine inches. It is to be preserved in the Natural History Museum, Brussels.

The Sedalia Natural History Society, of Sedalia, Mo., has our thanks for a copy of their Bulletin No. 1, which is a very neat pamphlet of thirty pages, containing the annual report, donations, constitution, etc., and a thirteen-page article on shells. The society seems to be in a very flourishing condition.

The Naturalists' Companion.

Vol. 1.

BROCKPORT, N. Y., DECEMBER, 1885.

No. 6.

MICROSCOPIC LIFE.

FROM TIDINGS FROM NATURE.

We admire the myriads of creatures that inhabit the depths of the ocean, from the monstrous whale to the smallest specimen of the finny tribe. Their chequered existence and efforts; their fighting, striving and disporting; their various and wonderful construction; the mode and manner of their subsistence, all fills us with wonder, and we are awe-inspired while contemplating the infinite and manifold capacity with

ation, how much more do we find ourselves carried away by that feeling while looking through a microscope, which reveals in a single drop of water scores of organisms which are so small as to hardly be conceived by the mind.

The Diatom is regarded by some naturalists as a plant, allied to the algae, by others they are considered as animals, but it is not here that we shall discuss the question. This class secretes a siliceous covering or shell, which encloses the softer parts or sarcode. They may be found in nearly all localities where there is a body of water.

Gather a small lump of mud from the bottom of a pond, wash it in test tubes with clear water and clean with acids, and by patient work, you will have countless numbers of these subjects in the sediment, inquisable to the naked eye, but under a powerful glass they appear in curious and beautiful forms. Some are attached to floating or fixed objects, others are free. Desmids are also considered as belonging to the vegetable kingdom, but they secrete no siliceous matter.

Let us look into a drop of clean water. It lies before us, clear and transparent, with no sign of life which we can detect, our breath is strong enough to agitate it and a few rays of the sun are sufficient to convert it into vapor. But placed between two squares of glass, beneath a microscope, and, lo! what a variety of life suddenly presents itself; we can scarcely trust our senses. The little drop has expanded into a large plain: wonderful shapes



DIATOMS.

which the Creating Power has stored the depths of the waters. But if the size, the power and the variety of the denizens of the deep excite our admir-

rush backwards and forwards, drawing towards and repulsing each other, or resting placidly and rocking themselves, as if they cradled on the waves of an extensive sea. These are no delusions; they are real living creatures, for they play with each other, rush violently upon one another, they whirl round each other, they free and propel themselves, and run from one place to another in order to renew the game with some other little creature, or madly they precipitate themselves upon one another, combat and struggle until the one conquers and the other is subdued; or carelessly they swim, until playfulness or rapacity is awakened anew.

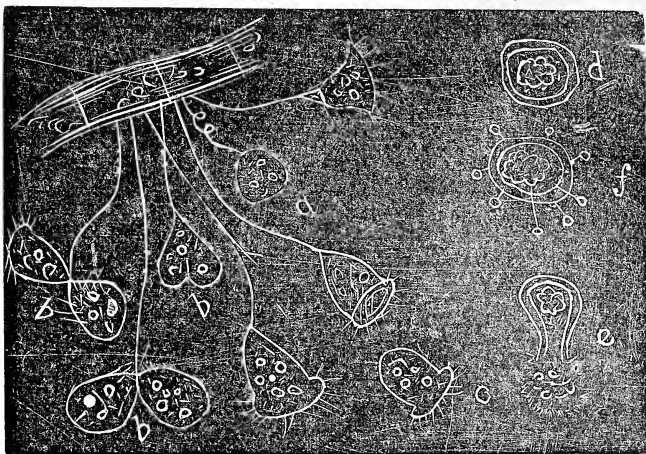
Under the general heading, Protozoa, comes the order of creatures which are separated from the diatoms and desmids and regarded by naturalists as animals. The name means "first or simplest animals." In most cases, except in the infusoria, these creatures have neither mouth nor stomach, and in none of them can the organs of sense be detected. Excepting the sponges they are very minute and only to be seen under the microscope.

This group includes Rhizopods, sponges, animals having root-like feet or appendages, and Infusoria.

In all the organisms of the Rhizopods the body is composed of a simple gelatinous substance, to which the term "sarcode" is applied. All locomotion is performed by the protrusion of processes which from their function are termed "pseudopodia" or false feet. On placing one of these creatures under a microscope, it is seen to resemble a mass of some transparent

jelly, altogether devoid of life. Soon, however, the animal begins to push out in various directions portions (pseudopodia) of the gelatinous mass of which it consists, and by the alternate expansion and retraction of these, it effects a slow and somewhat irregular locomotion. The amœba, as shown, belongs to this class.

The term Infusoria as originally used was almost synonymous with



VORTICELLA.

that of animalcules, but it is now very much restricted in its significations. It was first made use of by Otto Friedrich Muller, and was adopted by Cuvier, who made it the last class of Radiata; but their radiated structure has not been established. No distinct trace of nervous matter has been found.

The Vorticelli is a beautiful variety of infusoria. There are several species inhabiting ponds or stagnant water. Each bell-like form is attached to a twig by a slender thread, and waves back and forth in the water with the footstalks or thread fully stretched. This species usually increases by self-division. The globular bell becomes flattened, then notched, and lastly divided (b), when the newly formed bells become isolated (c), swims away, and

developes a new stalk (d, e, f) after fixing itself in a new place:

*A NATURALIST
CANOEING 200 MILES
IN THE ADIRONDACKS.*

By FALCON.

CHAPTER III.

We awoke the next morning expecting to see the sun, but were disappointed as a heavy fog hung over the woods, shutting out the light. However, about ten o'clock the sun came out and we started for the top of the mountain with a party of gentlemen who knew the way. The path led through a growth of thick underbush and in some places was nearly perpendicular. About half way up a Ruffed Grouse and her brood of ten young flew up and alighted a little farther on. In an instant all was confusion. Everybody who had a revolver was banging away regardless of consequences. Luckily for the Grouse and her brood, no execution was done, but we spent some time looking for remains. Of course everybody was surprised that nothing had been killed. We reached the top without accident, and the sight which met our gaze well repaid us for the trouble taken in getting there. The extreme point of the Blue Mountain is a large rock, entirely bare, and around this the trees have been cut away so that a splendid view is obtained. As far as we could see the earth was solid green, dotted here and there with lakes and mountains. No human

dwelling place in all this vast mass of trees could we see. The summit of this mountain is 3800 feet above the sea level. At this height there was a strong breeze, so after a short stay we started for the hotel. After dinner, having nothing else to do, the Professor and myself started for Long Lake, where the canoes were. The path lay for ten miles through pine woods, and just at dusk we arrived at the little Long Lake settlement and put up for the night at the hotel.

CHAPTER IV.

Six o'clock the next morning found us up and ready for the day's work, as we were to get the canoes out and pack them, preparatory to starting on our voyage. After breakfast we went to work and got out the two canoes, which luckily were in good condition, and only needed a coat of paint to make them as good as ever. They were twelve feet long, and made of a light framework of pine; on this heavy cotton drilling was stretched, which after being oiled was treated to two heavy coats of paint. The top was all decked over except a small cockpit in the center, where the canoeist set. A board placed on the bottom to sit on completed the rig with the exception of an eight-foot double-bladed paddle.

Continued on page 88.

The following is an extract from a letter recently received from one of our subscribers, which shows that the information contained in the Taxidermy department is not wasted:

"I stuffed my first animal yesterday—a squirrel. I think it is quite a success."

The Naturalists' Companion

AN ILLUSTRATED MONTHLY
PUBLISHED IN THE INTEREST
OF NATURAL HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, - - - N. Y.

We request all of our readers to send us a description of their collecting excursions, their finds, or any items they may think will be of interest to the readers of the COMPANION.

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BROCKPORT, MONROE COUNTY, N. Y.

RANDOM NOTES.

The New Moon has donned a cover.

We wish you all a merry Christmas and a very happy New Year.

With this number we have been with you half a year. Reader, does it seem possible. Don't you think we have improved very rapidly in that time.

The "La Timbrologie," from Paris, France, received. It is a very neat and attractive paper, but we would like to get some one to translate it.

Mr. Geo. F. Kunz, of Hoboken, N. J., has kindly favored us with several papers on scientific subjects, for which he has our sincere thanks.

Mr. J. C. Jay has sent us a sheet of stamps for our inspection. Although we are no judge of stamps, we can say, however, that they are the finest we have ever seen.

We are the recipient of a circular announcing the Am. Ornithologists' Union Check List of N. A. Birds, and Code of Nomenclature. According to the circular the check list will be one of the finest things ever produced, and should be in the hands of every naturalist. For particulars, etc., address, L. S. Foster, 35 Pine St., New York.

The Young Naturalist's Journal, which has recently made its debut in this busy world of ink, paste and scissors, is one of the most handsome and interesting papers we have seen. Its editor, Mr. J. A. Allen, is well known to our readers, he having contributed a number of interesting articles to this paper.

As may be seen we have changed our subscription rate to 35 cents per year, making it the cheapest and best paper of its kind published. We have made this reduction knowing that there were a large number of young naturalists in this country who could not afford to pay a large price for a natural history paper, but would gladly welcome one at 35 cents a year, therefore we look to this class of young people for their help and support in publishing our magazine. Let us not be disappointed. We want it distinctly understood hereafter that we will not accept any more infernal postage stamps. Editors insertings ads. for us will please change the subscription price to 35 cents.

Publishers copying from us will please give credit.

Never send your printing to other persons until you write us for estimates.

All articles in this paper, excepting those otherwise mentioned, were written expressly for it.

If you wish to obtain some excellent bargains read the advertisements in this issue, it will pay you finely.

The Hawkeye Observer is now published by E. K. Putnam, J. P. Hubbell and Gus. Finger, instead of by Chap. 158 of the A. A.

The subscription price to this paper is 35 cents in silver or postal note, but where stamps are sent, 50 cents will be charged.

Our young readers should not become impatient if the articles which they so kindly contributed have not yet appeared for they will be published as soon as space will permit.

What do you think of our new serial, Historical Geology, kindly contributed by Mr. Johnson, of New York city? It is, without doubt, the finest article yet written for this paper.

No collector should fail to obtain some of those fine crystals offered by A. B. Crim. They are as clear as glass, beautifully formed, and sparkle like real diamonds.

We are in receipt of a very tasty card announcing the fourth semi-annual convention of the Empire State Amateur Press Association, which convens Jan. 6, 1886, at Dieter's Hotel, 356 Fulton St., Brooklyn, N. Y.


We have received from George Stinson & Co., the well-known art publishers of Portland, Maine, a magnificent, full length, steel engraving of General Grant. It is after Anderson's celebrated photograph, which was made while the general was still in full vigor, and represents him in his sturdy, manly strength, as the people wish to remember him. It is, undoubtedly, the best portrait ever made of the general.

This is positively the last number of this paper you will receive unless you subscribe. Bear this in mind, please.

We will exchange the cut of the diatoms on the first page for a cut of equal value, or will sell it for \$1.50.

The deepest soundings ever made was in the Pacific ocean in 1874, near the entrance to Behring's sea. The depth was 4655 fathoms, and the cast was made from the United States ship Tuscarora.

WANTED—Back numbers of this paper. State price when writing. We have a large number of orders for back numbers which we will fill as soon as possible. Persons who have not already ordered back numbers and wish to get them should resort to the Exchange column as it will be impossible for us to furnish them.

 To PUBLISHERS. We are about to start a Newspaper Subscription Agency and would like to enter your paper on our list. It is our intention to take subscriptions for all the leading periodicals of the day, and shall publish a list of all the papers for which we have the agency, and circulate them in all parts of the country. Please give this your attention, and if you think favorable of it, reply immediately by postal, informing us of the best commission you are willing to allow us for taking subscriptions for your paper.

We are happy to note the starting of large numbers of natural history associations in this country, and are always willing to lend them a helping hand. Prominent among these associations is the Young American Collector's Association, of King's Mountain, N. C. The President, W. T. R. Bell, Jr., informs us that the association is in a very flourishing condition, and is about to issue a hand-book, and also a monthly paper to be known as the "Young American Association." The association was only formed about two years ago. May the association live long and prosper.

*A NATURALIST
CANOEING 200 MILES
IN THE ADIRONDACKS.*

Continued from page 85.

I had never been in one before, so when I made my first attempt I came near getting a ducking, but with the aid of the Professor I managed to keep right side up, as we paddled along the shore fringed with pines, in search of a shanty which, we had been told, existed "somewhere on the lake." At last an opening in the trees attracted our attention, and a little ways from the shore stood the shanty, looking rather gloomy in the dim light, beneath the heavy covering of pines. We landed, (at least the Professor did, and as for me I always wondered how I got out of my canoe and on land without getting wet) and went to work unloading and carrying the contents of the canoes up to shanty. After we had hauled the canoes out of the water to dry, preparatory for painting them, and built a roaring fire in front of the shanty, things looked more home-like and I began to look around. The shanty was built similar to most of those we saw, being log cabin fashion. A square structure of logs, open at one end is first built; on top of this a light framework of saplings is erected open towards the fire and slanting off at the back. This frame is covered with large sheets of bark, stripped off the trees in the spring. Such was our house inside, the ground was covered with sprigs of hemlock, making a very fragrant and springy bed. After supper we replenished the fire, and rolling our-

selves up in our blankets, with feet to the fire, slept.

(TO BE CONTINUED.)

HISTORICAL GEOLOGY.

A SERIAL.

BY FRANKLIN C. JOHNSON.

INTRODUCTION.

Geology is the history of the earth's crust. The science, as now understood, is that once, millions and millions of years ago, our earth was a glowing star; in fact, nothing more than a mass of melted rocks and matter. But as ages and ages passed by, this molten mass became gradually cool, and the surface harder and covered with water. But while this cooling was going on, the red-hot mass beneath the thin surface heaved and yearned, throwing up continents and islands. This land soon became covered with a strange and imperfect vegetation, and a little later animals began to appear; at first of a very low type, but growing more perfect as time went on. Now this long time, consisting of millions and millions of years, is divided by geologists into four great eras or times, as follows:

The Archæan (beginning); the Palæozoic (ancient life); the Mesozoic (middle life); and the Cenozoic (recent life.)

CHAPTER I.

THE ARCHÆAN TIME.

"This era commenced with the origin of the earth's crust" *

It is divided into two periods, the

*Dana.

Huronian and Lacrentine.

The Archæan surface rocks of North America comprise a V shaped region, running from the Arctic Ocean on the north-west to the great lakes, and then north-east to Labrador. This V shaped region was the first dry land of the continent. The rocks of the Archæan Time are mostly crystalline or metamorphic, and comprises granite, gneiss, marble, quartzite, syenite, limestone, etc. Beds of graphite, porphy, soapstone and slates are found. This was the age of iron making.

The earlier part of the Archæan Time was of course without life of any kind. But as soon as the earth was cool enough, life began to appear. The first organisms were very simple, such as seaweeds, etc.

CHAPTER II.

PALEOZOIC TIME.

The Paleozoic time is divided into three ages, namely: The Silurian or age of mollusks, the Devonian or age of fishes, and the Carboniferous or age of coal-plants.

I--SILURIAN AGE.

The name Silurian comes from a region in Wales, where the rocks are found, and which had been formerly inhabited by a tribe of Britons, called Silures.

This was the first grand act on the stage of life.

The Silurian age is subdivided as follows:

SILURIAN AGE.	UPPER.	4 Oriskany Period.
		3 Lower Helderberg P'd
		2 Silina Period.
	LOWER.	1 Niagara Period.
		3 Hudson Period.
		2 Trenton Period.
		1 Potsdam Period.

Probably at this time the Appalachians and the Rocky Mountains were already towering out from the sea. The land was mostly low and rocky, and the shallow waters were filled with mollusks and crustaceans. The sun shown pale and dim through the dense atmosphere, throwing an uncertain light over the scene.

The first period of this age is the

POTSDAM PERIOD.

This period is named from a town in northern New York by that name. The formation is found in Pennsylvania and westward through Michigan, along Lake Superior, through Wisconsin and Minnesota, to the Black Hills of Dakota. It runs so'thward from Vermont to Alabama along the Appalachian range. It is also found in Texas. The rock varies in different places. At some places being a coarse, hard sandstone and in others a fine white sand. In many places these rocks are found worm-burrowed and marked with ripples and mud-cracks. They are also often found with marks and tracks of the animals of that time. This shows they were not made in deep water, but on a low sand-beach or mud-flat; and that part of the time they were above the water, and exposed to the sun.

The trilobite, a crustacean, is the most conspicuous and interesting fossil of this period, and also of the whole Silurian age. It has been found almost perfectly preserved. It had an oval figure, and was covered with a jointed crust. No legs have ever been found with trilobites; they are supposed to have had only a kind of thin membraneous plates, for swimming.

A small shell called *Lingula* is

found in great numbers. It grew on a stem when alive. It is about the size and shape of the finger-nail.

The great number of worm-holes found in the rocks of this period prove the existence of marine worms.

There were many crinoids during this period, as is proved by the number of broken crinoid stems found in its rocks.

During this period there was no moss or grass. The sea had no fish, and the air no birds, or even the meanest insect.

(TO BE CONTINUED.)

THE BAD LANDS.

By C. D. PENDELL.

Though nearly every one has heard of the Bad Lands, very few could give any explanation as to their character or origin. The name is applied to several wild, desolate, treeless and barren tracts of land in Colorado, Nebraska and Montana; but is especially applicable to the south-western portion of Dakota, along the White River.

This region consists of immense beds of clay, cut out by the combined action of frost and water and of rivers which were extinct ages ago, into thousands of columnar masses often one or two hundred feet high. These columns are sometimes round, smooth and tapering, like the small end of an egg. Others, as Winchell happily remarks, "in their endless succession, assume the appearance of massive artificial structures decked out with all the accessories of buttress and

turret, arched doorway and clustered shaft, pinnacle and finial and tapering spire. On nearer approach the illusion vanishes and all the forms which fancy had conjured are resolved into barren desolation." The traveler lost in the confined labyrinthian passages might wander for days and in the voiceless and motionless solitude, under the scorching rays poured down from above and reflected from the white soil and walls, destitute of tree or shrub to shelter him, and naught to quench the thirst which overpowers him, finally mingle his bones with the titanic remains of primeval monsters.

Those clayey walls are built up mostly with the fragmentary remains of the animal life of the Tertiary period. The Bad Lands are, in fact, a literal Goizotta. At every step we tread upon the remains of former ages; at every blow of the pickaxe the bones of unknown species are revealed. Hundreds of fossil turtles lay about on every side, single specimens often weighing over a ton.

Entering this valley of dry bones and calling comparative anatomy to our aid, we again unite the broken skeletons and erect once more the frame work of an animal organism. Now imagine the skin once more to cover this frame and life to invigorate this system, and lo! we are in an ante-diluvian museum. There stands the gigantic mastodon; here is an animal resembling the modern tapir, but its head is surmounted with a pair of horns and it is eight feet high. This strange animal is called the *titanotherium*. Next we come to the *dinoceras*, an animal rivaling in

size the elephant. It has a longer neck, however, and consequently no trunk, and the tusks are replaced by three pairs of horns. Scores of other animals equally strange meet our gaze, together with the rhinoceros, elephant, camel, horse, wolf, and other modern animals.

Fossil fish and mollusk are everywhere scattered around; and the abundant fossil flora prove that an exuberant vegetation once existed on these now barren wastes. The leaves of many trees common to our latitude and those of the torrid zone—fig, cinnamon and palm—have been found. It is probable that this now desolate region was once a vast tropical swamp, and that the numerous fauna made this their favorite feeding ground. Many of these animals, venturing too far in order to reach some tempting morsel became mired and, unable to extricate themselves, perished—their fossil remains alone testifying to their primeval greatness.

How do you like the typographical appearance of this number?

Six kinds of microbes have been detected by M. Lustig in the fluids of horses afflicted with influenza.

Be sure that you get a pack of those dandy cards for sale by Shepherd of this place. They are great.

For want of space we have been obliged to omit the article on the winter birds of Prince Edward Island. It will be continued in the next number.

J. H. Paul, London, England, has our thanks for a copy of the "Young Naturalist," which is very interesting, indeed. From the advertisements it contains we infer the curiosity business must be booming on tother side of the puddle.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Del., to whom all articles pertaining to the subject should be addressed.

WHO BUILT THE MOUNDS?

The above question has baffled the minds of men for years, and to-day it can no more be satisfactorily answered than when the mounds were first discovered. A Western collector once endeavored to prove to us that, because the relics found upon the surface were similar to those found in the mounds, they were made by the same race. By this he meant to say that the Indians built the mounds. In Scotland and northern England many stone axes, arrow-heads and other relics are found like those in America. Now, because the relics found in the two places are similar, does that go to show that they were all made by the same race? If the Indians built the mounds, why did they not build them in the Eastern States as well as the West, for surface relics are as numerous in the one place as the other. Take, for instance, a stone axe or arrow-head found in Delaware and compare it with those found in Ohio and no difference in the workmanship can be found; yet mounds are very numerous in the latter place, and none whatever in the former. I think this alone breaks down the idea that, because the relics found in the field resembles those found in the mounds, they were made by the same race. Also, when the Jesuit priests first discovered the mounds in the valley of the Mississippi they asked the Indians who

built them. The Indians answered by saying that, although the traditions of their people extended back many centuries, neither they nor their forefathers knew who built them.

This is a highly interesting question, and I hope that archaeologists will take hold of and express their ideas upon it.

Near Astoria, Ore., there is a deposit of clam shells which covers an area of over four acres, and is piled in places to a depth of ten feet. The amount of shells is incalculable. Over a thousand loads have been hauled away to make roads, but that amount is hardly noticed in the diminution of the immense heap. From time to time relics of the old clam-eating tribes that made the place their headquarters are found. A party recently found a clam-opener. It was made from a whale's tooth, is about eight inches long, and is ground sharp at the end. There are some sixteen inches of soil on top of these immense clam-beds, on which grow fir trees, some of them four hundred years old.

THE SOARING BIRDS.

In a short paper under this title put forward by Mr. I. Lancaster, of Chicago, an attempt is made to explain the equilibrium of soaring birds by the mechanical action of currents of air on inclined planes. A horizontal air current, meeting the inclined plane of the bird's wings, is resolved into two forces, one in the direction of the inclined plane and the other at right angles to it, so that the creature when poised in mid-air may be said to be continually slid-

ing down an upward current of air. In test of this theory, practical observations were made on the southwestern coast of Florida, where soaring birds are somewhat abundant. On one occasion, a score of light gray pelicans rose in the air and floated in the vicinity for several hours, offering an excellent opportunity for studying their motions. One of the birds had at first some difficulty in obtaining a position, but in the end maintained a steadier poise than any of the others. The flock was about thirty feet distant from the observer and their wings were apparently perfectly rigid. Finally, one of the birds rose steadily in the air at the rate of about ten feet per second until a mile or more above the sea. . . . The problem is one of considerable interest, and particularly if its solution, as seems not unlikely, has any bearing upon the question of aerial navigation. The explanation offered is not satisfactory in several particulars, for the assumption that the entire force of an air current is changed by the bird's surface from horizontal to vertical is not warranted, nor does it account for the motion or poise of soaring birds during a period of calm.—SCIENTIFIC AMERICAN.

On the 29th of September, between 8 and 9 p. m., a mirage was observed by many persons at Valla in Sweden. The entire lower part of the northwestern horizon shone with a lurid glare, above which was a cloud-bank assuming the most remarkable forms. From time to time animals, trees and shrubs were seen. Later a group of dancers were seen, the men being distinguished from the women. Further north the cloud formed an oak forest, in front of which there was a valley, and nearer still a park with sanded paths, and at about 9:30 the cloud sank into a mass and the phenomenon disappeared.—NATURE.

Show this paper to your friends.

TAXIDERMYY.

A serial on preparing and preserving animals, birds, reptiles, insects, etc., etc.

VALUE OF STEAM IN TAXIDERMYY

FROM RANDOM NOTES.

Steam is generally used to soften the wings of birds so they can be spread, or the feet that they may be opened or closed. The positions of various portions of dried skins or mounted specimens, may, to a limited extent, be changed by its use. For ail of the above uses it is valuable, inasmuch as it saves time. The steam does its work quickly, but a few seconds' exposure being necessary; while the slower method of wet cotton, cloths, or sand, requires several hours, according to the nature of the specimens. Another advantage in favor of the former is, that while the later keeps the specimens soft for a considerable time, steam dries away almost immediately.

It is also very valuable for restoring crumpled or bent feathers (not broken) to their original shape, though it will not interlace the webs if parted. Many taxidermists have doubtless tried steaming skins they intended to mount, but such as we have heard from were not pleased with the result.

The fact that steam will shrink skin may not be new, but we think its practical use in taxidermy has but recently been discovered, and that Mr. G. M. Gray, in our employ, has that honor. It was a purely accidental discovery, but, like many others, will come under—"necessity is the mother of invention." The facts of the case are as follows: We had mounted a small black and tan dog, the skin of which stretched so badly that we stuffed it a trifle to full, to dispose of the wrinkles. The owner was not satisfied, and wanted it made smaller. We agreed to do what we could to remedy the trouble, and turn-

ed the job over to Mr. Gray. He tried every conceivable way to make it smaller, but all to no purpose. The tea-kettle was steaming merrily, and as a last resort, he thrust the dog into the volume of steam pouring from the nose, then rubbed it down with his hand. After doing this a few times, to his surprise and pleasure, he saw the desired object was being attained, and a few moments later had the satisfaction of seeing the dog reduced all over to the required size. The owner also, was pleased.

We next experimented on a Roseate Spoonbill which had been mounted for five years, and of which the naked throat was badly wrinkled. This also was a success.

Still another trial was made, this time on a rattle-snake, that had the skin so badly distended in places that some parts had to be filled much too full. These parts were worked down to be uniform with the rest. The snake was next coiled and all of the kinks steamed out.

Since then we have made use of steam constantly, and keep the kettle ready to boil at nearly all times. We should be pleased to hear the results of experiments by others.

The remains of a mammoth were recently discovered near Geneva, N. Y.

The meteor which recently fell near Owatonna, Minn., has been blasted with dynamite, and the fragments are being sent to various parts of the country.—CHICAGO JOURNAL.

A curious incident occurred in the Parade Church, Shorncliffe, England, on a recent Sunday. It was found that the church was besieged by various kinds of birds, principally swallows. Every effort was made to dislodge them, but without effect, and at last some soldiers were obliged to fire a volley of blank cartridges, which completely routed them.

CORRESPONDENCE.

This Column is open free to yearly subscribers only.

J. N. A., Jr., Lake View, Ills.—If you will describe the birds and where the nests were found we will endeavor to answer your questions

W. S. S., Richmond, Kan.—We have not the books mentioned and do not know of their being published. Will look them up, however. Davie's new check list is not yet published. We do not know the price.

C. I. W., Summerville, S. C.—Pure arsenic, with a little powdered alum added, will answer the purpose, although arsenical soap is by far the best. You can reduce the recipe according to the amount of the soap you desire. We have no files of this paper for sale. See article under Random Notes. We will endeavor to answer other queries in our next.

WILL some of our readers kindly inform us how to skeletonize leaves, also give us a description of the female Bobolink.

We have a number of question which we will endeavor to answer in No. 7.

OUR AGENTS.

The following persons are authorized to receive subscriptions and advertisements for this paper. We will give a very liberal commission to persons who will act as our agents. Write for circulars and terms.

J. M. Beers, 126 E. Water St., Elmira, N. Y., C. I. Walker, Summerville, S. C., R. W. Ford, Bristol, Conn., Arthur F. Clark, 414 Orleans St., Keokuk, Iowa, Geo. H. Selover, Lake City, Minn.

Bennett & Dean, the famous curiosity dealers, of Cortland, N. Y., has our thanks for a copy of the Vicksburg Citizen, printed on wall-paper at the time of the siege, when Grant "caught the rabbit, etc." The firm are selling them at 10 cents each. Get one!

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

H. E. DEATS, Flemington, N. J.—A 5 cent nickel without the word "cents" for Nos. 1, 2 and 3 of NATURALISTS' COMPANION.

A. C. RANDALL, St. Johnsbury, Vt.—Minerals and curiosities from Vermont to exchange for minerals and curiosities from other states.

COLLECTOR, 305 French St., Wilmington, Del.—Minerals and all kinds of specimens for Indian relics and first-class birds' eggs. Lists exchanged.

E. G. HARLOW, Lynn, Mass.—Starfish, sea urchins and all kinds of sea curiosities for arrowheads and general curiosities.

C. I. WALKER, Summerville, S. C.—Will exchange marl, tea seeds, shells, rock used to build jetties on Charleston bar, etc., for Indian arrowheads or spearheads in quantities or small lots.

C. D. PENDELL, Edinboro, Pa.—A \$15 violin in box, \$25 worth of minerals, several books and a good pair of roller skates for a magic lantern in perfect order and giving a nine-foot view, or a good job press.

CHAS. P. GUELF, Brockport, N. Y.—40 lbs. of small pica Roman type, in good condition, for display type, printing material, scientific books or instruments, or offers. The display type perfered.

A. B. ROBERTS, Grangerburgh, Medina Co., Ohio.—First-class eggs of the White-rumped Shrike, Am. Goldfinch, English Sparrow, Kingbird, Cowbird, Mourning Dove, Brown Thrasher, Red-and-black-shouldered Blackbird, Purple Grackle and Grass Finch to exchange for Indian relics, rare minerals, good curiosities, named fossils, etc. Correspondence desired.

The Naturalists' Companion.

VOL. I.

BROCKPORT, N. Y., JANUARY, 1886.

No. 7.

A COLLECTING TRIP.

It was about seven o'clock in the forenoon of a bright spring day, when I, accompanied by a friend, started off on a collecting trip. It was when the most of the birds of this vicinity were nesting. We went about two miles up the railroad and then struck for a belt of timber thickly interspersed with underbrush and wild grape vines, which we thought would be a good place for birds' nests. We worked our way a short distance into the timber and then separated for a search. Soon after parting I saw a Chewink hop from a low bush so thickly covered with vines that I could hardly tell that it was a bush, and on examining closely I saw a nest containing four eggs. I picked one of the eggs up and saw that it was slightly chipped and knowing all the other eggs in the nest were so, I carefully placed it back and continued my search away further. On looking up into a small elm tree I saw a Jay's nest which contained six fresh eggs, and putting them in my box after blowing them, I went on and on until I was about tired out from walking so far through such a mass of undergrowth, when finally I met my friend and we started for the rail-road, which we soon reached, and journeyed on for a mile or two farther. While we were walking along my friend told me what he had found, and showed me a set of four Yellow-breasted Chat's eggs and five eggs of the Black-capped Chickadee, besides a great many eggs of the Brown Thrasher and Mourning Dove, for which we cared but little, as they are very common here.

We soon left the railroad and entered a piece of timber which was clear of underbrush, so we looked especially for Woodpecker's nests in the large trees. I soon discovered a good sized hole in a large oak tree which looked as though it might contain something. With the aid of my friend I soon reached the opening, and thrust my hand in the hole but could not find the bottom. I then stuck a stick down and heard something snap at it, then on examining where I thought the bottom of the hole must be I found that the wood was decayed, and with the aid of my knife soon cut into the hole, and saw to my astonishment two young Screech Owls, and after some difficulty I succeeded in securing them. In a short time we found a Chewink's nest containing four eggs which were fresh. After advancing a ways farther we came to some small bushes which were growing among the trees all over one side of a hill, in which we found five sets of Yellow-breasted Chat's eggs and four sets of the Cardinal Grosbeaks besides some eggs of the Red-and-buff-shouldered Blackbird. Now as it was getting late and we wanted to get home before dark we started at once, having considerable fun on the way with our young owls, and well pleased with our day's work. F. H. BORGHOLTHAUS,
Lawrence, Kansas.

So perfect were the Egyptians in the manufacture of perfumes that some of their ancient ointment, preserved in an alabaster vase in the museum at Munich, still retains a very powerful odor, though it must be between 2,000 and 3,000 years old.

*A NATURALIST
CANOEING 200 MILES
IN THE ADIRONDACKS.*

BY FALCON.

CHAPTER V.

In this manner we spent two more days, during which time the canoes were given a fresh coat of paint. We varied the general course of things by target practice, trolling for pike, (of which the lake is full) and racing. By the third day I had learned to keep my canoe from upsetting, and as the other canoe was dry, we carefully repacked them, and started for the wilderness. Paddling down the lake for a mile we landed on a sandy beach at the foot of the "carry" to Clear Pond. These "carries" are bridle paths cut through the forest from one lake to another, and are just wide enough for a man to carry his boat easily. We each shouldered a boat and started along the path. The path was not as smooth as a paved road by any means but we managed to walk and carry the canoes without much trouble. After walking for about thirty minutes we perceived a break in the trees, and mounting a small knoll, Clear Pond burst upon our view. This pond, nestling as it does among the mountains, is well named. I think that I never saw a purer and clearer sheet of water. For quite a distance from land pebbles on the bottom can be seen, looking as if they were but a few feet away. On one side of the pond was a summer shanty, set on a piece of cleared ground, but differing from our former stopping place, being built of boards, loosely fastened. After supper, which was both dinner and supper to us, we shouldered our rifles and went back to Long Lake after the mail. It was very dark when we came back, and as we had no lantern, traveling was extremely difficult, but we finally got back,

to the shanty without any accident, and lay down to sleep by a roaring camp fire.

CHAPTER VI.

At 4:30 o'clock A. M., July 31st, 1884, we were up and the Professor was preparing breakfast while I took the provisions from the canoes, which had been drawn upon the beach. Our plan was to stay a day and examine the lake, and the following morning to proceed farther inland. Breakfast being over we got into our canoes and started on a tour of inspection around the lake. Several loons could be seen but as soon as we came near, they would shoot under the water, leaving only a faint ripple to mark the spot where they went down. A small brook emptied into the lake from the south, and being a fine locality for trout, we soon had our flies in working order. They would just touch the water, and some times before, when a leap, a splash and the pole would bend like a reed as a big fish was landed. After I had enjoyed this sport for a short time I went to hunt for loon's nests, of which I found three, built in the long reeds near the shore. Going on land near the brook, I found a medley of tracks in the soft sand, birds, panthers, wild cats and here and there a larger one which showed the presence of a bear. A drop or two of rain warned us that we had better start for the shanty, and before we reached it it rained hard. We expected to have a glorious time "lying off" in the shanty, but to our utter disgust, when we got there we found that the roof leaked badly. So instead of enjoying ourselves we were obliged to squat down to our supper, with coats over us, and "grin and bear it." However about five o'clock it cleared up and began to grow cold, so after a hot supper we tumbled in. Next morning we were up bright and early, and after packing the canoes,

paddled to the "carry" which was to lead us to Slim Pond, our next camp. Striking Mud Pond about noon, we put our canoes in again and began to work through. This pond is very correctly named. The water is only about three feet in its deepest part, but you can take your paddle and stick it for seven feet right into the mud and then strike nothing solid. Not a very nice place to get tipped over in you observe. Its only beauty lies in the multitude of white water-lillies which literally cover it, hence it is a favorite feeding ground of the deer. At last we got through it and paddled up a small inlet to Little Slim Pond. Nothing of interest on this body of water, not even a shanty. The inlet from Little Slim to Slim Pond was so shallow that after getting stuck once or twice we pulled off our shoes and stockings and waded, pulling the canoes after us. At last we were rewarded by the sight of Slim Pond and we immediately tumbled into the canoes and paddled along the shore in search of the shanty, which we found just at dusk. Building a good fire, we had supper and went to sleep, well satisfied with that day's journey.

TO BE CONTINUED.

An Interesting Letter.

MCGRAWVILLE, N. Y., Jan. 8, 1886.
Chas. P. Guelf.

Dear Sir:—

Three days ago I called on Messrs. Bennett & Dean, curiosity dealers, Cortland, N. Y., and was treated to an examination of their large stock of natural history specimens. Most certainly was I entertained with its beauty, its diversity and endless variety. They have used rare judgment in their selections, and the excellent quality they offer so cheaply to collectors. They will be successful, for their gentlemanly treatment and low prices are adjuncts of success. J. G. BINGHAM.

A COOT'S EGG HATCHED IN COTTON.

On the 24 of June, 1885, as I was out on an egg collecting tour, I found a Coot's nest containing seven eggs, of which I took five, and packed them in cotton in my collecting box. On reaching home that day I placed the box which contained the eggs in a bureau drawer and did not open it again for three days. Upon opening it the third day, I discovered that one of the eggs had hatched out, and the bird still alive. I fed the bird upon worms and bits of bread for three days, during which time it prospered finely. I thought that as he was a water bird, a bath would certainly do him good, so I procured a basin of water and put him in it. He acted spry and lively at the time, but on the following day died, I suppose from keeping him in the water too long. G. A. MORRIS.

Seneca Falls, N. Y.

What an Advertiser Says.

LOS ANGELES, CAL., Dec. 27, 1885.
Charles P. Guelf.

My Dear Sir:—

I have been so busy of late that I have had little or no time to attend to your kind favor of the 6th ult. However I will insert an inch "ad." in your valuable paper on the plan so kindly suggested by you. I say valuable paper without the least attempt at flattery, but from experience. I can safely say that of all the answers I have had from "ad's" in at least a dozen different amateur and oological papers, at least two-thirds of the whole number mentioned your publication. I therefore feel at liberty and justified in saying that I think it is one of the best advertising mediums I have had the satisfaction of patronizing.

Sincerely yours,

A. M. SHIELDS.

The Naturalists' Companion

AN ILLUSTRATED MONTHLY
PUBLISHED IN THE INTEREST
OF NATURAL HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, — N. Y., U. S. A.

We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any Items they may think will be of interest to the readers of the COMPANION.

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RANDOM NOTES.

In the National Museum at Washington in a number of little trays are 42,000 birds' eggs, varying in size from that of the humming bird to that of the giant dodo, whose remains are found in Madagascar.

Who knows but some day many of our young friends who write for this paper may become a second Agassiz, a Dana, a Wood or an Audubon.

Has any one of our readers ever seen a hoop snake? If they have they will confer an everlasting favor on the publisher by informing him of the same, and stating how they knew it to be a hoop snake.

It is stated that a plant has been discovered in South America which possesses strong electrical properties. On breaking a twig a shock is felt, and a compass is affected at a distance of some feet from the plant.

If you wish to secure a bargain that is a bargain do not fail to notice the advertisements of E. M. Haight on the second and fourth pages of the cover. Those who fail to purchase of him now will lose a chance that occurs but once in a life time.

The birds of Louisiana, papers of that state say, will soon be exterminated. The colored people there not only make birds an article of food, but have begun to use their eggs for the same purpose. The eggs of the partridges, robins, wrens, mocking birds, and all others that they can get their hands on, are eaten.

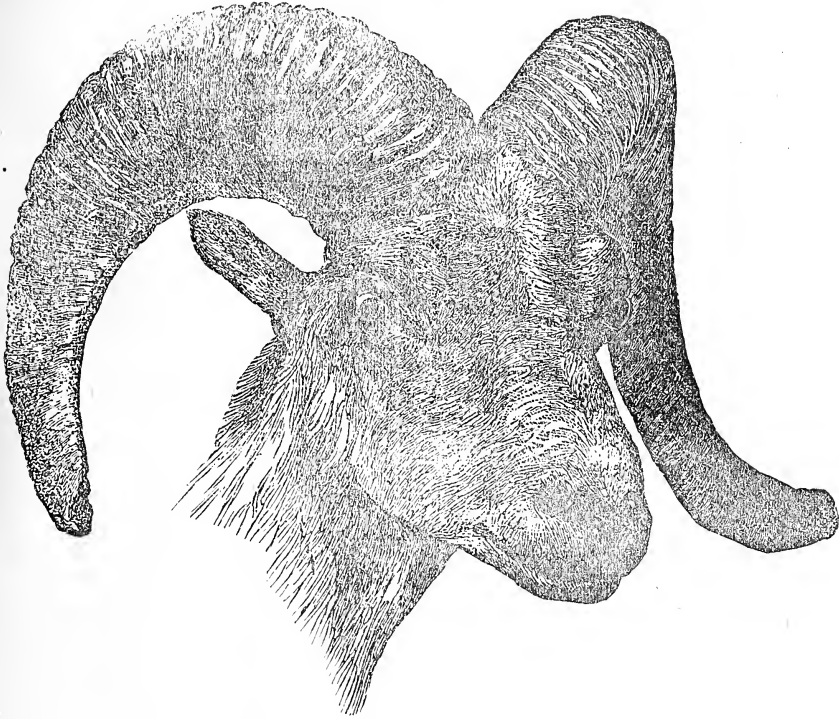
The second edition of Davie's famous EGG CHECK LIST is now ready. The regular price of this most valuable book is one dollar and we are prepared to sell it at that price; or, those who will send us \$1.10 in silver or postal note, we will send the check list and this paper one year free. The book contains 200 pages and seven full page illustrations, and contains a full and accurate description of all the nests and eggs of the land and water birds of North America known to date, together with the breeding range and habitat of the species and ornithological synonyms. It is fully worth twice the price asked.

See our premium list.

WILD RACES OF SHEEP.

It is usually supposed that the American Rocky Mountain Sheep is the only wild sheep in existence. This is a mistake, indeed, our continent can only claim to possess this species at second-hand; as it exists in the Stannovoi Mountains of Siberia and Kamtschatka, it is probable that the original parents

et; 2, *Ovis Ammon*, of the Himalayas; 3, *Ovis Montana*, or *Canadensis*, of North America and Siberia; 4, *Ovis Vignei*, the "sha-poo" of Thibet; 5, *Ovis Cycloceros*; 6, *Ovis Jerdoni*; 7, *Ovis Selateri*; these being the species of the Punjab, a mountain district in northern India; 8, *Ovis Gmelini*, of Armenia; 9, *Ovis Nahura*, the "burrel" of the Himalayas; 10, *Ovis burrel*; 11,



HEAD OF OVIS AMMON.

of our race immigrated hither from Asia. This supposition is strengthened by the fact that nearly all the old races of sheep in existence, are found in Asia, where at least ten species are known to occur. Two wild species of sheep are found in Africa, and one of these is also in Corsica, and is an immigrant from the adjoining continent. It may be interesting to mention these different races as follows: 1, *Ovis Polii*, named after Marcus Polo, who discovered it in Thib-

et; 2, *Ovis Ammon*, of the Himalayas; 3, *Ovis Montana*, or *Canadensis*, of North America and Siberia; 4, *Ovis Vignei*, the "sha-poo" of Thibet; 5, *Ovis Cycloceros*; 6, *Ovis Jerdoni*; 7, *Ovis Selateri*; these being the species of the Punjab, a mountain district in northern India; 8, *Ovis Gmelini*, of Armenia; 9, *Ovis Nahura*, the "burrel" of the Himalayas; 10, *Ovis burrel*; 11,

Olervia Pulla; and 12, *Olervia Ornata*, the "aoudad" of Africa, which are a long-tailed sheep, and the latter of which is the moufflon of the mountains of Corsica. *Ovis Polii* is a remarkable species, as may be judged from a pair of its horns, which have a spread of five feet. This is as much horn as is carried by a pretty fair Texan steer. The skull and horns of this sheep are used to decorate the temples of the Thibetians. The sheep

is called "rasse" by the natives, and it inhabits the wildest of the mountain range of Chinese Tartary and Thibet. It is a larger animal than *Ovis Ammon*, usually considered the finest of the sheep. This latter is called the blue sheep of the Himalayas, and as nearly as large as an ox, standing four feet high at the shoulders. The coat is hair of a slaty-blue color. It has enormous horns, which it uses in violent combats. The horns are thus frequently broken off, when they are utilized by foxes and small animals as roomy and convenient dwellings. This sheep ranges the southern slopes of the mountains, at an elevation of twenty to thirty-five thousand feet, where it grazes on the grassy patches, which are swept bare of snow by the frequent storms. On the other slope, the *Ovis Vignei*, or Ibex, ranges. This sheep differs from *Ovis Ammon*, in size and in the corrugations and shape of the horns, which have a spread of two feet, and also in the color of its coat. Its habits are very similar, however, and in this respect one race differs very little from another. It is an interesting subject for speculation, how our domestic sheep has become evolved from these wild races, which are so unlike their cultivated relatives.—YOUNG NATURALIST.

AN ANCIENT RIVER.

Vessels from the Atlantic enter the Gulf of St. Lawrence by the Strait of Canceau, which divides the island of Cape Breton from Nova Scotia. This is one of the most singular marine highways in the world. Soon after passing the antique French town of Arachat, the land closes in, and we find ourselves in a narrow waterway, from half a mile to a mile in width and fifteen miles in length, cut right across the structure of the rough Palæozoic country. As the ocean steamer threads its narrow waters amid wooded bluffs and low green meadows, we seem to be ascending some no-

ble river. And a river this has been. A river the principal part of whose course is now sunk beneath the blue roll of the Gulf waves.

All around the southern part of the Gulf of St. Lawrence there is abundant evidence of recent subsidence. In Baie de Vert and Cumberland basin perfect stumps of trees are found rooted 30 feet and 40 feet below the tide level. In the Post Glacial Period the Strait of Northumberland was a dry wooded valley, traced by the upper course of this ancient river. The headwaters of the stream tumbled from the crags of the Cobquids on the one hand, and from the Triassic hills of Prince Edward Island on the other, and it empties into the Atlantic through a gorge as profound as that of Niagara. The mastadon slaked his thirst at its foaming rapids, and Palæozoic man explored its tide for a precarious meal. This water-course has been the boundary line between Cape Breton and Nova Scotia since a time running back into the geological ages, and has proved an effectual barrier to the distribution of several tribes of animals.

Strange that the upper course of a river should be lost beneath the sea while its lower remain still among the water-ways of the continent. But the secret is soon told. The headwaters of this ancient river of Canceau were situated within the area of a great synclinal fold of the earth's crust, which for ages has been bearing down land and stream to make a bed for fresh sedimentary deposits; while its lower course was across the corresponding anticlinal, forming here the primary ridge of the Nova Scotian peninsula.

FRANCIS BAIN,
Prince Edward Island.

Please remember and don't send us any postage stamps in payment for subscriptions of advertisements. If you do they will be rejected.

Job printing done at marvelous cheap prices at the COMPANION Job Office.

EXTINCT BIRDS.

BY CHAS. D. PENDELL.

THOUGH perhaps not properly birds strictly speaking, geological researches have brought to light two or three at least, remarkable bird-like reptiles belonging to the Cretaceous Period. The *Hadrosaurus* was an immense biped from twenty to twenty-five feet high, having legs shaped like those of an ostrich but of elephantine strength and structure. The upper parts of this prodigy were comparatively slender. Its head was also small and its mouth furnished with teeth for browsing among the higher branches. With strange and lofty form, and clothed, instead of feathers, with serpent-like scales of various colors which glittered with metallic luster, this animal must indeed have presented a frightful aspect.

The *Laelaps* was another equally gigantic biped of this period; one of the most terrible and rapacious monsters the earth ever saw. It could run with great swiftness, and rushed upon its prey by titanic leaps, throwing its huge bulk thirty feet and crushing its victim under its gigantic talons.

Far surpassing in its strange monstrosity the flying dragon of pagan mythology, is the *Pterodactyle*. Its bones were hollow, like birds', but it bore no feathers. Its head, shaped like a swans', had a mouthfull of teeth like the crocodile. Its wings had a spread of about sixteen feet.

Numerous footprints, and of many sizes, of extinct birds have been found in the old red sandstone of the Connecticut valley. How solemn and impressive the thought that, "the footprints of these dumb and senseless creatures have been preserved in all their perfection for thousands of ages, while so many of the works of man which date but a century back have been obliterated from the records of time!" Some

of these tracks measure fifteen inches in length and so deep as to hold two quarts of water. According to Hitchcock this bird greatly exceeded the ostrich in size being at least twelve feet high and weighing from 400 to 800 pounds. The remains of a buzzard have also been found which was equal in size to the largest condor that soars in his majestic flight above the lofty peaks of the Andes.

But of those just described we have only geological record. Others there are, however, which have inhabited this earth since the advent of man, and have within his memory become extinct, and are now without representatives of their kind.

The disappearance of the gigantic *Dinornis* (or *Moa*, as the natives called it.) from New Zealand dates from no very distant epoch. A portion of the skeleton of one which was eighteen feet high is in a London museum. The ancient legends of this island tell us that at the time of its discovery it was full of birds of appalling size, and described the ceremonies that took place when one was killed. Some of the hills are still strewn with the bones of this ornithological mammoth—the remains of the great feasts of the hunters. An egg of this bird which was found not many years ago, was ten inches long and seven inches wide and was of a dirty brown color. It was sold for about \$1,000.

Madagascar also furnishes another representative in the *Epiornis*, which was even of greater size than the preceding. The museum at Paris has an egg of this colossal bird which is six times as large as an ostrich egg. Accurate calculations demonstrate the startling fact that to fill the cavity would require 12,000 humming birds' eggs! The shell was two-twentyfifths of an inch thick and could only be broken with a blow from a hammer. Imagine the strength of the young bird to force its way out into the world.

The Geirfugl or giant-auk was not many years ago numbered among the existing species of Iceland and indeed was known to inhabit our own coast of Maine. This noble bird was three feet high and had a black bill a little more than four inches long. Its wings were mere stumps like those of the Antarctic penguin, but under water it could swim with amazing speed, making a mile and a half in one minute. They were very improlific laying but one egg in a season and if this was destroyed no other was laid until the next year. To-day not a single specimen of this handsome bird exists alive. The skin in the Museum of Natural History in Central Park is valued at over \$1000. Vassar College also possesses a specimen, but there are probably not over a dozen specimens in the entire world. The last living bird was killed in 1844, and their extermination is undoubtedly complete.

WINTER BIRDS OF PRINCE EDWARD ISLAND.

BY FRANCIS BAIN.

Our only permanent residents really abundant in the winter months are the little Black-capped and Hudsonian Chickadees. We have rarely any Shrikes, and the Chickadees' mode of nesting secures them against the larger birds of prey, and, being the only insectivorous tribes of consequence during winter, they have an ample supply of food, so that they enjoy a regular paradise here among the groves of gray lichen-fir. Everywhere you turn, even in the most severe weather, a merry chick-pee-dee greets you, and a little black-cap bobs from among the snow-laden boughs.

The Hudsonian Chickadee is less pert and obtrusive than its black-cap-

ped friend. Like a coy maiden in sober brown it keeps to the retirement of the thickets, attracting little attention with its soft, whispered notes. I think that both species, though plenty at all times, are less abundant in midwinter.

The Gold-crested Kinglet and the Red-bellied and White-bellied Nuthatches are permanent residents, though by no means abundant. Besides the Downy and Hairy Woodpeckers, and a rare Black-backed Woodpecker, the Brown Creeper may sometimes be seen in midwinter. Blue Jays are numerous, but Canadian Jays uncommon. During severe winters Crows get very scarce, yet a few will brave the most Arctic temperature while grain stacks are to be pilfered from.

Goshawks are residents here and the terror of the desolate forest. Often we see the blood-stained snow and the scattered feathers of a Jay, or the fur of a hare, where this marauder has had his meal.

Among Owls, the Barred and Horned Owls are the most common. The Snowy Owl visits us in winter; the curious bell-like tones of the little Arcadian Owl form the first voice of spring in the wintry woodlands.

After the ice closes round the Island in January we see but few water fowl. Yet, in mild winters, occasional Golden eyes, Oldsquaws, Mergansers, or Eider Ducks, may be observed. Herring and Black-backed Gulls come in during softer spells and survey the ice-locked bosoms of the harbors for some quieter opening to fish in. But the Terns and the great fleets of Bonaparte Gulls, that all summer long drifted, like snow-clouds, round the blue bays, had all left in October, when these were first silvered with the breath of December.

TO BE CONTINUED.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Del., to whom all articles pertaining to the subject should be addressed.

PREHISTORIC INDIANS.

"Archæologic and ethnologic researches which have been prosecuted during the past four or five years," says Captain Stevenson, of the Geological Survey Bureau, "in different localities on our continent, especially in our Southwestern Territories, have thrown much light and information not only upon the history of the present aboriginal inhabitants, but also predecessors, or the prehistoric races that inhabited that portion of our country. As each year's explorations are prosecuted, with the additional experience of the previous year, the web of information is broadened and a more comprehensive and definite knowledge of these people is obtained. The bureau extended its researches into more remote and less known localities during the past season with most gratifying results. One locality visited and explored by a party under the direction of Professor Powell last summer is worthy of special mention. Near Flagstaff, in Arizona, is a mountain called San Francisco Mountain. This mountain is of valcanoic origin, and around it, extending for many miles in all directions, are prominent volcanic cinder cones, ranging from five hundred to two thousand feet in height. The outer crusts of these cones are quite hard, while beneath this crust is a compact body of cinders or tufa. The party visited a number of these cones, on which they found a series of ancient cave houses artificially excavated by a post of a rude character, which was evidenced by the implements and domestic utensils left in these caves. One of the most conspicuous of these villages was found to occupy a large area, from the top far

down the side of one of these mountains. The cave dwellings are of an oval shape, about twenty-five feet across the base, and perhaps fifteen feet high. The entrance or doorway consists of a square hole cut in the crust, from which a shaft descends fifteen feet to the bottom. Alongside of the entrance shaft is a groove about one foot in depth, which served as a chimney. The dwellings were without windows and the occupants must have learned to grope their way through the dwellings in the dark. In many instances there are side shafts, which lead into connecting chambers. The party also found many small chambers excavated into the side of the dwelling, which were used to store away corn and other food stuffs."

"In one cave, which was plastered, a small niche was discovered which had been hermetically sealed up and which contained several small objects or clay stands, in which were stuck fragments of a finely woven cotton fabric so nicely twisted up as to show that they were carefully arranged and placed in this niche and sealed up for some sacred purpose; quantities of corn-cobs, charred beans and squash seeds and other objects of a vegetable character, also many stone implements of large and small size, some weighing two hundred pounds, all of which gave some idea of the people who made and used them. There are many of these cave villages situated on these volcanic cones. Professor Powell considers them the oldest and most primitive inhabitations on this continent. Notwithstanding this fact, he feels confident from the evidences presented by these caves that the occupants were the direct ancestors of some of the Meca dwelling tribes now inhabiting portions of Arizona and New Mexico and he also feels assured that future researches will clearly reveal the history and relationship between these tribes that have passed away and those now living in that region."

HISTORICAL GEOLOGY.

A SERIAL.

BY FRANKLIN C. JOHNSON.

CHAPTER III.

TRENTON PERIOD.

The Trenton formation extends along the Appalachian range, from the Green Mountains to Alabama. It is also found in the north and west. The Trenton limestone takes its name from Trenton Falls, on West Canada Creek, near Utica, Oneida County, N. Y. The Galena limestone is included in it.

During this period the seas swarmed with life; but nothing terrestrial has ever been found. A coiled shell, called *MACLURE MAGNA*, is abundant. Corals, crinoids, shells, etc., are found in immense numbers. Trilobites appear in great numbers. A coral, bearing the short name of *COLUMNARIA ALREOLATA*, is very abundant. It is often found in great masses of a ton's weight. It looks almost precisely like honeycomb. But the rover of the Silurian seas of this period was the *Orthoceratite*. They had a long shell which was divided into partitions, somewhat like the shell of the *Nautilus*. They have been found with a shell 30 thirty feet long.

HUDSON PERIOD.

This formation is found along the Mohawk and Hudson rivers. It is also found on Lake Michigan, in the Mississippi valley, and along the Appalachian range. The sea is still full of trilobites, orthoceratites, corals, shells, etc. A radiate, the *GRAPTOLITE* (rock-writing) is numerous during this period.

Lake Champlain was made during this period.

NIAGARA PERIOD.

This formation is found though the Appalachian region. Also in Canada and the West.

Sea weeds are very plentiful.

During this period crinoids became abundant. Crinoids are often called "stone-lillies" because their cup-shaped body much resembles a lillie in shape. From their bodies there branched out five or more long arms, which branched out again to sometimes as many as a thousand. The long stalks were jointed.

SALINA PERIOD.

This period takes its name from the Salina salt springs near the city of Syracuse, N. Y.

The formation runs parallel with the Niagara limestone westward to Milwaukee. The rocks are mostly shales, marls, and limestone. Gypsum is common.

Fossils are rare. The salt water was probably unfavorable to animal life.

LOWER HELDERBERG PERIOD.

So called from the Helderberg Mountains, near Albany, N. Y. The formation is found in many parts of the State of New York, also in Ohio, Indiana, Tennessee, Illinois, Maine, and parts of the South.

Many fossils are found in the limestone of this period.

A crustacean, the *EURYPTERUS* is found in large numbers. It is somewhat like the trilobite. Some of them attained the length of six feet or more.

Small slender cones, called *TENTACULITES*, which almost compose the mass of some of the rocks, are abundant.

Corals and crinoids were very abundant.

ORISKANY PERIOD.

This formation extends from the town of Oriskany, N. Y., southward to Virginia. It is also found in Maine.

The fossil most abundant is a brachiopod, called the *SPIRIFER ARENOSUS*.

CHAPTER IV.

II. DEVONIAN AGE.

This is the second great act on the stage of life.

It takes its name from the county of Devon, England, where the rocks are

found and are filled with fossils. It is often called the Old Red Sandstone.

During this age fishes, insects and plants become abundant.

This age is divided as follows :

DEVONIAN AGE.	4	Catskill Period.
	3	Chemung Period.
	2	Hamilton Period.
	1	Upper Helderberg Period.

UPPER HELDERBERG PERIOD.

This formation is found in New York, from there it can be traced westward to the Mississippi, and is found in Iowa and Missouri. It is thickest along the Appalachian range.

This was the period of corals. In some places the limestone is nothing more than remains of a coral reef. At the falls on the Ohio, near Louisville, Kentucky, they are very abundant. They are found there in all shapes, some standing in the position of growth.

HAMILTON PERIOD.

This formation extends from New York to Michigan and from there to the Mississippi river and beyond. It is also found in Pennsylvania, some of the southern states and Nova Scotia. The rocks are mostly sandstones and shales.

The ORTHOCERATITE is found during this period. The GONIATITE, which is somewhat like the ORTHOCERATITE, is also abundant. A trilobite, PHACOPS BUFO, is a common fossil.

The earliest remains of insects are found in the rocks of this period.

During this period terrestrial plants first became abundant.

CHEMUNG PERIOD.

This formation is found in many localities in New York and Pennsylvania.

Garnoids were abundant. Scales of HOLOPTYCHINS have been found in the beds of this period which were over an inch and one half broad.

CATSKILL PERIOD.

The Catskill formation is found in the Catskill Mountains, also along the Appalachians. Fossils are rare, but the scales of fishes and the remains of plants

are sometimes met with.

TO BE CONTINUED.

A WONDERFUL PLANT.

BY HARRY HARRIS.

On the northern boundary of Siberia, the land of perpetual snow, there is found a remarkable plant, or rather flower, which springs from its own composite atoms on the first day of each year—as if to celebrate the birth of another twelve months—and grows to the height of three feet, blossoms on the third day, and remains in bloom for the brief period of twenty-four hours, at the end of this time it desolves itself into its own original element—the stem, leaves and flowers being of the finest and purest of snow.

The stalk of this marvelous phenomena of the snow is one inch in diameter, The leaves, which are three in number, and in the broadest part are only an inch and one-half in width, are covered with infinitesimal cones of snow. The leaves only grow on one side of the stalk, to the north, curving gracefully in the same direction. This frost flower when fully expanded is in shape a perfect star. The petals are two inches in length, one-half inch wide at the broadest part, and taper sharply to the point. They are also interlaced with the others in a beautiful manner, forming the most delicate, most wonderful basket of frost work that can be conceived. The seeds of this flower of the snow are the size of a pinhead, and are to be found on the third day after the flower has sprung up, on the extremities of the anther, trembling and glittering like diamonds.

This plant, which if it is touched, immediately falls to pieces, was discovered in 1863 by Count Swinskoff, the eminent Russian naturalist and botanist, who was ennobled by the Czar on account of his discovery.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

ARTHUR C. ROBERTS, Grangerburg, Medina Co., Ohio.—A collection of 15 varieties of labeled wood, $4 \times 2\frac{1}{4}$ in., for best offer of 1X1 minerals.

J. J. SCHNEIDER, Anaheim, Cal.—First-class Californian birds' eggs, single and in sets, with full data, to exchange for others. Send lists.

C. F. HOTCHKIN, 101 Main St., Binghamton, N. Y.—A letter seal with monogram for A. A. chapters with number, if desired, for minerals or natural curiosities.

C. I. WALKER, JR., Summerville, S. C.—3 fossils for No. 2 of this paper. Coins for arrowheads, spear heads, minerals or curiosities. Fossils for books on natural history.

C. P. GUELF, Brockport, N. Y.—Will exchange a fine large collection of minerals and curiosities for a young hunting dog in good condition, pointer preferred. Or will give cash or other exchanges. When writing state size, weight, color, age, name, pedigree, if any, and give a full and complete description.

WILL H. PHILLIPS, 19 Bigelow ave., Cincinnati, Ohio.—Indian arrowheads, pieces of pottery and Cincinnati fossils for revenue, document, match, medicine and playing-card stamps, 12 arrowheads for 20 different match, medicine or playing-card stamps, 8 for 15, 5 for 10, 10 for 30 mixed, or 5 for 15 mixed.

G. T. BEARD, 1657 Mission St., San Francisco, Cal.—Fine side-blown eggs of the thick-billed gullimot, burgomaster gull, double-crested puffin, green patch cormorant, English sparrow, etc., for other first-class eggs, etc. Shells, Alaska starfish, and minerals to exchange for eggs, minerals, shells, Indian relics, also foreign stamps for the same.

A. G. KING, Brockport, N. Y.—A life with mouth-piece, and a book on penmanship, finely illustrated, for a good flute or a large double-bass bow.

J. C. JAY, La Hoyt, Iowa.—Minerals, fossils, shells, Indian relics, and all kinds of sea curiosities for stamps of any kind; or any of the above for stamp and curiosity papers. 2 arrowheads for No. 1 of this paper.

CORRESPONDENCE.

This Column is open free to yearly subscribers only.

HOW TO SKELETONIZE LEAVES.

To C. I. W., Summerville, S. C.—The following is a good recipe for skeletonizing leaves: A tablespoonful of chlorid of lime in a liquid state, mixed with a quart of pure spring water. Leaves or seed vessels of plants should be soaked in the mixture for about four hours, then taken out and well washed in a large basin filled with water, after which they should be left to dry with free exposure to light and air. Some of the larger species of forest leaves or such as have strong ribs will require to be left rather more than four hours in the liquid.

GLENN STEARNS,
Circleville, Tex.

G. T. B., San Francisco, Cal.—Davie's Egg Check List contains the nomenclature of N. A. birds. Price at this office, \$1.00.

We will have better paper in our next.

For want of space the article on Taxidermy was crowded out. It will be continued in No. 8, also our list of agents.

Send to 18 Winthrop Place, Chicago, for a copy of the Young Naturalist, an illustrated 16-page monthly, which we are printing for a firm there.

Editor Naturalists' Companion.

Your paper is the best advertising medium we have advertised in.

BENNETT & DEAN, Cortland, N. Y.

The Naturalists' Companion.

VOL. 1. BROCKPORT, N. Y., FEB. AND MARCH, 1886. NOS. 8 AND 9.

CARNIVOROUS PARROTS

IN New Zealand, there lives a large species of parrot called by the natives, KEA. Since the introduction of sheep into the island, this bird has developed the habit of attacking and killing sheep. We present our

sides of the helpless creatures, often biting out the intestines, and thus deliberately killing them ; they then feed on the remains. The amount of injury done by them in their raids on the sheep folds of New Zealand has been greatly exaggerated, says Dr. Menzies, an authority on the subject, who states



readers with an illustration of the bird and its method of attack. When pressed by hunger, these birds will alight on the sheep, and despite the most vigorous resistance, peck holes in the

that "on one run, where the loss was unusually large, the proportion of sheep attacked was about one in 300. Those pasturing below the elevation of 2,000 feet are seldom disturbed." The

sheep's heads thrown out from the slaughter pens are picked perfectly clean by these birds. The total length of the kea is 18 inches, the bill being $2\frac{1}{2}$ inches. There are a pair of these birds in the Museum of Natural History in Central Park, New York.

A NATURALIST CANOEING 200 MILES IN THE ADIRONDACKS.

BY FALCON.

CHAPTER VII.

Here we were, twenty miles from any settlement, in a regular wilderness of trees and lakes. We expected to stay here for two three days and the Professor being taken sick on the second day, compelled us to stay longer. During this time I was not idle by any means but divided my time between fishing, cooking, and killing mosquitoes. These little pests together with a tiny black fly, called in the language of the woods, "punkies," made life miserable every night until we had thoroughly smoked the shanty; and even then some of the boldest had the audacity to enter and disturb our slumbers. There were no trout in the lake so I had to put up with bullheads or catfish and dace, which were very abundant and of large size. Every evening, just as the sun was setting, any one by looking up might have seen hundreds of chimney swifts circling about in the sky above, but where they came from and whether they nested in the woods or came from some settlement in search of the numerous insects, was more than I could decide. By the fourth day of our stay at Slim Pond the Professor

was much better, and as our stock of provisions was reduced to the scanty proportions of a half a loaf of bread and a lemon, we considered that it was time we were moving, so accordingly one afternoon we paddled off bag and baggage to the foot of Slim Pond, and there took the carry to Stone Pond. The first quarter of a mile of this carry was on rather peculiar ground. The soil seemed to float on the water, and and as we would walk on it, it would bend and sink in a very alarming manner, and if by chance you should get your leg through you would think that it was a good representative of the "slough of despond." Immense quantities of pitcher plants covered the surface of this queer island. We got over it safely, however, and in about an hour we immersed on Stony Pond, a small, uninteresting body of water about a mile long. At the end of the carry night overtook us so we built up a good fire and after having a hearty (?) supper on bread and lemon, we rolled up in our blankets and were dead to the world around us.

CHAPTER VIII.

"Hurrah for Little Tupper!" I sung out the next morning, as we came in sight of that beautiful lake. We had risen before the sun and started on the carry, and just as he began to gild the tops of the trees with light we got into our canoes and started for the only hotel the lake has, and in fact the only one for miles around. Here we stayed till afternoon when we were again on the move. Paddling to the foot of Little Tupper Lake and through its outlet to Round Pond, where we camped for the night. Next morning we were up early

and had the canoes packed, although it was raining a little. Carrying our canoes for a couple of miles we were again on the water on what is called Bog River, but why, I could never tell, as no bogs could we see; nothing but stones.

TO BE CONTINUED.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

EUGENE W. GRAFFORD, Danbury, Ia.
—Tobacco tags for same. All letters promptly answered.

BESSIE NEVILL, box 3, Breslau, N. Y.
—3 postmarks, a starfish, a fossil shell, a puddingstone or a revenue stamp for a revenue stamp not in my collection.

ARTHUR J. COX, box 1713, Iowa City, Ia.—Polished or unpolished Devonian corals for fossils, Indian relics, minerals or marine specimens.

FRANK BOLL, 102 Saratoga, Ave., Rochester, N. Y.—Vol. 1 of the Young Oologist, Davie's Egg Check List and Vol. 1 of the Stamp and Coin Gazette for foreign coins.

JOSEPH WIGGLESWORTH, Wilmington, Del.—Minerals and general curiosities of all kinds for fine curiosities, birds' eggs or Indian relics. Send your list and receive mine in return.

ARTHUR NEVILL, box 3, Breslau, N. Y.
—A new scroll saw, 29 patterns, extra saws, etc., for an International album, latest edition and in good condition, with or without stamps. Magazines, foreign and domestic newspapers for rare postage stamps or the latest edition of Scott's stamp catalogue. No approval sheets wanted.

PHILIP H. SEIBEL, 735 O'Farrell St., San Francisco, Cal.—A starfish or sea urchin for every mineral or fossil not less than 2x2 inches. Specimens of serpentine and slag (any size) for suitable cabinet specimens.

H. Y. Z., care this office.—A collection of over 200 different foreign and domestic stamps and a first-class Colt's revolver, 44 caliber, and shoots equal to a rifle, for a silver, open-face watch. Elgin, P. S. Bartlett, or any good works in running order.

J. H. MERRILL, Wenham, Mass.—U. S. and foreign stamps, a few copies of the American Naturalist and a lot of magazines and papers for minerals, Indian relics and curiosities. I would like to correspond with boys and girls who are interested in mineralogy.

W. F. MORAGNE, New Salem, N. C.
—One or more specimens of good minerals (list sent on application for selection) or a fine specimen of landscape marble, nicely dressed, showing landscape or ocean view, for mailing boxes 2½x3 inches or 3x4 inches, 1 inch deep; pasteboard or wood, by the 100 or gross. The same offer for a rubber stamp. Write first.

CONTINUED ON PAGE 14C.

The carp is dormant during the cold months, and does not eat.

Recent observations, according to Mr. E. J. Miers, of the British Museum, show that crabs do not reach great depths in the ocean. The Challenger expedition obtained few specimens from points more than 400 fathoms below the surface, and only a single specimen was found at a depth of 1000 fathoms.

GREAT AGE OF FISHES.

It is not generally known that there is hardly any limit to the age of a fish. Prof. Baird, of the United States fish commission, is the authority for the statement that there is authentic evidence to show that carp have maintained an age of 200 years.

There is a tradition that within fifty years a pike was living in Russia whose age dated back to the fifteenth century.

There are gold-fish in Washington that have belonged to one family over fifty years. They do not appear much larger than when they were originally placed in the aquarium, and are every bit as lively as when young.

The Russian Minister says that in the royal aquarium at St. Petersburg there are fish today that have been known by the records to have been in them 140 years. Some of them are, he says, over five times as large as they were when first captured, while some have not grown an inch.

An attache of the Chinese legation says that there are sacred fish kept in some of the palaces in in China that are older than any of those in Russia.—Philadelphia Press.

Subscribe now.

It is proposed that a portion of the reclaimed Potomac flats be devoted to a zoological garden.

Professor Oscar Schmidt, the great zoologist, is dead at Strasburg, aged sixty-four years. He was the first to discover in Goethe's writings that poet's affinity with the later teachings of Darwin.

WINTER BIRDS OF PRINCE EDWARD ISLAND.

BY FRANCIS BAIN.

The Kittiwake is the true bird of the wintery wave. In the narrows of the harbor, where the contracted current is swiftest, there is often a restricted opening in the ice, even in midwinter.

When the deep waters of the Gulf are frozen as far as the eye can see from the most elevated hilltop, the Kittiwakes will come in and gather round this little spot of blue, circling and dipping and rending the keen air with their harsh KE-A, KE-O; reminding us, as we watch them amid nature's fiercest aspect, of the amazing possibilities of animate being.

It will be observed that our northern visitors are about the same as appear in the neighboring Provinces of the mainland. It is otherwise with our summer visitants from the South. A number of birds of more southern habit, as the Catbird, Bluebird, Scarlet Tanager, Rose-breasted Grosbeak, Indigo Bunting, Bobolink, Red-winged Blackbird, Meadow Lark, Baltimore Oriole, and Whip-poor-will, which visit New Brunswick and Nova Scotia, are never seen on Prince Edward Island. There is no reason to be found in the existing state of things why some of these birds should not stay over here and enjoy our delightful summer season, which is superior to that of the Atlantic seaboard. The reason is to be found in the fact that the Island was separated from the mainland in the earlier days of the modern period, when the climate was cooler than at present, and the more southern tribes of birds had not yet distributed

themselves in these northern Provinces. Since their distribution in these parts the Northumberland Straits have proved a barrier to their movements which they have not yet learned to overcome.

In studying the botany of the Maritime Provinces we find that the same thing exists in regard to the plants of Prince Edward Island. Many plants of more southern habit, common to the Provinces of the mainland, have been excluded from the Island by its early separation from the continent.

In the birds the fact shows the exceeding tardiness with which they adopt new lines of migration, and, consequently, the tenacity with which they adhere to established habits in their migrations and distribution.

It also reveals something of the great northward movement of the feathered tribes which must have followed the recession of the cold of the Glacial Period, pointing out those which were the last to arrive within the limits of these Provinces.

THE END.

A FISH STORY.

BY C. H. JENNER,

Professor of Natural and Applied Sciences.

It is stated that there is now over 1,870 different kinds of fishes in the waters of North America, but of all the finny family—though we have wonderful accounts of individuals of the various kinds exhibiting evidences of marked intelligence—I doubt if there was ever a specimen found that would compare favorably with one that I had in my aquarium a few years ago. Its color was brown; shape, nearly as round as a cigar, with perfect “water-

lines” from tip of nose to tail, with dorsal fin, two flippers set well forward and rather well up on its sides, with tail-fin of the codfish order, all well proportioned for the body, which was about three inches long, rather slender, and faultlessly formed. This finny little creature was very pugnacious towards all living creatures excepting his master; allowing himself at any time to be lifted from the water and layed upon the table where he would remain for a half hour without the least sign of uneasiness; in fact has been known to remain on a dry board for five hours at one time, and when put back into his native element he would at once commence his favorite freaks, as standing on his head (on the bottom), then upon his tail, then nearly half of his length, tail up, out of water then head up, with about one-third his length out of water and turning his head from side to side at an angle of about twenty degrees, to see if he stood vertical; or some have said he was looking at his companions below, as much as to say: “What do you think of that?” then taking a position about mid way in the tank, he would commence a vigorous breathing, and working his caudal fin in proportion, would remain in the same place, when of a sudden he would stop breathing (i. e., stop taking in water at his mouth and forcing it out at his gills), but keeping his tail moving precisely the same, which would cause him to glide stem-wise until his tail fin would touch the tank, his tail-fin would then stop working and he would recommence breathing, which would carry him forward across the tank; then reversing the order would move back to the centre, were he would exhibit to his best

ability that he understood that action and reaction were equal ; or he demonstrated fully that he knew that two opposite equal forces would nutralize each other, for he would vary the amount of water forced from his gills: from their full capacity to the least perceptive mite, thereby varying its reaching force to move him forward, at the same time varying the amount of backward pull by his tail to exactly equal the varying forward push by breathing. He would cease all voluntary motion and settle slowly to the bottom; then as quick as a flash of light, he would go to the top, take in an excess of air, and return to exactly the same place he had just acquitted, and would take precisely the same position as before. When perfect quiet would be resumed he would buoy himself gently towards the top, and when his dorsal fin reached the surface of the water, he would emit from his mouth a large bubble of air and immediately commence sinking but when near the centre would dart to the top, take a draught of air and at once commence sinking, but when near the centre would again dart to the top, take in more air, and return again direct to the centre where he would remain quiet for a short time; but finally again buoy himself upwards, but this time he would emit but little air when he would rise more slowly; then a little less air would escape his mouth, and so on, less and less, as he rose more slowly, until the volume of air expelled would be less than half the diameter of this period. But if he failed to establish a perfect equilibrium between himself and the water he displaced before he reached the top, so that his dorsal fin would not rise above the surface of the water, he

would expell sufficient air so as to allow himself to settle; he would rise, take in more air and go through the operation until he succeeded in establishing a perfect equilibrium between himself and the water. These evolutions of my "young Archimedes"—for that is what I called him—was often and repeatedly witnessed by many besides my own family, all of whom were compelled to admit that my little aquatic pet knew the difference between air and water as well as did Galileo's proud deciple, Torricelli, who in 1643 first demonstrated the weight of the air. Also, that he as fully and clearly demonstrated from knowledge the laws of equilibrium and specific gravity as did the immortal philosopher Archimedes 2116 years ago. Archimedes discovered the law of levers and specific gravity while taking a bath, out of which he sprang and ran naked into the street, crying: "Eureka! Eureka!" (I have found it! I have found it!)

OUR WINTER BIRDS.

There are a great many more birds to be found here in winter than is generally supposed. Except to the student of nature only the Crow and Snowbird are to be seen. Most of the birds that remain with us the year around are more common about the houses in winter than in summer.

One of the most plentiful of these resident birds is the common Crow (*CORVUS FRUGNIVOUS*).

Another quite common bird is the Horned Lark, which is often found feeding in company with Snowbirds.

The Meadow Lark (*STURNELLA MAGNA*), is occasionally seen.

A few White-rumped Shrikes (*LANIUS*

LUDOVICIANUS EXCUITORIDER), winter here.

The Cardinal Grosbeak (CARDINALIS VIRGINIANUS), is quite common. They gather in flocks and inhabit the woods.

The shrill note of the Tufted Titmouse (LOPHOPHANES BICOLOR), attracts attention as it explores the tops of trees.

Another somewhat resembling it is the Black-capped Chickadee (PARUS ATRICAPILLUS), which inhabits the woods, especially the cedars.

Besides these there are numerous Hawks and Owls.

Canadian Geese are also here and occasionally Ducks, and some times on mild winters Robins and Blackbirds are seen.

WM. S. SMITH,

Richmond, Kan.

UNKNOWN BIRDS.

DEAR EDITOR:—

While on my way to work five miles north of this place on the 6th day of January, 1886, I saw a flock of birds entirely foreign to this country, and would like for you or some of the readers of the "N. C." to tell me what they are. I am a man forty-one years old, and have always been a great admirer of our feathered friends from my earliest remembrance, and yet I never met them before. I will give you as good a description of them as I can: Size, a little larger than the Red-breasted Grosbeak; beak, yellow, and fully as large as that of the Grosbeak. Male, head and back of neck black; breast, deep chestnut-brown; yellowish-white stripes running from beak over eyes to back of head; tail and tail coverts chestnut-brown; wings, primaries deep black, secondaries yellowish-white (nearly white); belly and under side of tail deep golden yel-

low. Female, brown, or about the color of female Yellowbirds, where male is chestnut brown; wings, secondaries lighter than in the male; yellow underneath like male.

When I first saw them they were in a bunch of willows picking objects from the bark, and were so tame that I approached near enough to see their eyes, and consequently had a good opportunity to study them. When they flew again it was but for a short distance and then alighted on some weeds by the roadside and ate the seeds from off them. I regret very much that I did not have my gun, as I would have greatly prized one of them in my collection of stuffed birds. By the way, I shot and stuffed on the 16th of last October a Robin with snow-white wings. I have often heard of white or albino Robins and have seen them myself, but this is the first red one with clear white wings that I have ever seen. Hoping that you or some of our readers can give me some light as to what kind of birds they are, and that this will not find its way to the waste basket, I am

Fraternally yours,

R. D. Goss,

New Sharon, Iowa.

Will some of our readers kindly look these birds up and report the results of their labors to us for publication in our next issue. It is quite evident that Mr. Goss has discovered a new species. We have no recollection of ever seeing or reading of a bird that would answer his description; we shall, however, investigate the matter more thoroughly, and hope our readers will do the same. —Ed.

See our great bargains in specimens. It is proposed that a portion of the reclaimed Potomac flats be devoted to a zoological garden.

AGASSIZ ASSOCIATION.

The following is an extract from a letter recently received from a member of Chapter 847 of the Agassiz Association, situated at Washington, Indiana, which fully illustrates the enthusiasm with which the members of the association take hold of the work before them, and it is wonderful what rapid progress they make. If any of our readers would like to form a Chapter of the association we would respectfully refer them to the president, Mr. Harland H. Ballard, Lenox, Mass.

"Chapter 847 consists of about twenty-three members—active, honorary and conditional. By conditional I mean those who join for a short time only, to remain permanently if they become interested in the work.

The Chapter has for a meeting room a large room about 20x30 feet. At one end of the room is the secretary's desk, at which also the treasurer sits. The president sits back of them at a small table; above the president's chair hangs Agassiz's portrait, wreathed in flowers and grasses. At the other end of the room is the cabinet, having large glass doors above and drawers below. In the upper portion are contained the trays of shells and minerals, the cases of insects, and jars containing reptiles in alcohol. In the lower portion are the plants, skins and such other articles as have no interest to the visitors, but are valuable to members. Our library contains about fifty volumes of general interest, twenty on scientific topics, and numerous magazines, weeklies and manuscript papers. Around the walls of the room are hung pictures of noted scientists, scenes, plants, as well as brackets holding crystalized vases, silver and zinc trees (chemical)

and vases of flowers, some dried and others treated with wax.

We gave an entertainment Christmas night in our hall, which netted us a neat sum, to be expended for specimens and books. On each side of the room we erected temporary tables, highest near wall. Upon these were exhibited our specimens, including insects, mounted birds, skins, shells, minerals, plants and woods. Each department was presided over by the curators—one curator and an assistant to each division. In the centre of the room a long line of tables had been placed, upon which our novelties and articles for sale were arranged. Among the former were to be found shell and seed frames, baskets ornamented with dyed fish scales, albums of pressed sea-weeds, etc., spatter-work, designs of leaves, flowers and other objects of interest, Indian relics, rustic stands, boxes and frames ornamented with colored sands and grains, drawings of plants, and other articles too numerous and varied to mention. Upon the sale-tables were duplicates of most of the above and cards with Agassiz's photograph attached thereunto. The articles sold rapidly and at a handsome profit to the Chapter, many visitors taking a number of articles, and every person taking some one thing as a memento of the entertainment. About two hundred persons were present during the evening, some coming and leaving early so as to attend other entertainments. The room was crowded the whole evening, and our members received many compliments upon the good taste shown in the arrangements. We have been asked to repeat it, with all necessary modifications, upon Agassiz's birthday, and in all probabilities shall do so.

This part of the state is a regular

bonanza to collectors during the part of the year which extends from the breaking up of winter until the snow falls again. Rare insects were found this year as well as great numbers of the more common species. Minerals are well represented in this—Davies—and the adjacent counties; many varieties of plants are found; the streams and damp forests supply us with fishes, reptiles and amphibian; mollusks are found in quantities to satisfy any collector's wants. North-west of the city are several Indian mounds. All around the county are often discovered hatchets, axes and arrow-heads. Part of the remains of a mastadon were found last summer, and many fossils, rare as well as common, abound here.

NATURALIST,
Washington, Ind.

THE WHITE-RUMPED SHRIKE.

(LANIUS LUDOVICIANUS EXCUBITORIDES).

This little tyrant, although no where abundant, is found in almost every section of our country, from Carolina to Oregon. What boy or girl who takes any notice of nature does not know our "Butcher-bird" at sight? This species, like all the other representatives of the LANIDÆ, is migratory, and arrives here about the first of April, or in very early seasons, some ten days or so sooner. Always arriving in pairs we cannot observe them during the mateing season. From five to ten days after their arrival the first work is begun on the nest. The first nest is built very slowly, taking over two weeks for completion. It is composed of sticks, grass, rags, strings, etc., and is always carefully and thickly lined with white feathers. Considering

the earliness of the season of incubation, the nest is one of the most comfortable if not the neatest ever made by birds for their young. The favorite position for their abode is in a tall hedge or in an isolated tree in a broad meadow. Plum trees are very often selected, as they afford them the means of "stringing up" their victims. The principal food of this bird is various kinds of large insects, which it often draws up in a line on the barbs of a wire fence, to await its wants at a future day; and then, for recreation, it will kill a small bird with which to feed its waiting brood. Often has the writer seen a small bird, as the American Goldfinch or the Chipping Sparrow, with a plum thorn through its neck awaiting the "Butcher's" pleasure. Even birds as large as the Bank Swallow and Catbird fall before the tyrant's conquering beak. It is very easy to find the nest of this bird. In early spring before the leaves are fairly out it is easily seen at twenty rods distance; and a bird of this species, if followed about for some time, is sure to go directly to its nest. It is seldom found more than a quarter of a mile from the nest, and then only when in search of food. If one set of eggs be taken another set is deposited, sometimes in the same nest but more often in a new one, constructed within a few rods of the first. The second nest takes less than half the amount of time and material required for the first, and is frequently completed in two or three days. The first set is six, occasionally five, but the second is almost always five, and when that is taken or destroyed a third will generally be deposited, containing four or five eggs. I have known the same pair of birds to build four nests in one season,

and to have three sets taken and hatch the fourth. On the 15th of May, 1884, a set of seven eggs, nearly hatched, was taken by me, and the 10th of May, 1885, in the same nest was found seven eggs more, incubation advanced, which I now have. Fresh eggs may be found in this latitude from the 15th of April to the 1st of July. The ground color of the eggs is a yellowish-white or very light cream, and is almost entirely covered by spots and blotches, varying in color from light slate to a dark drab or grayish-brown. These are generally more numerous about the larger end, and but rarely form a confluent about the smaller end. The eggs measure about .95 by .72, and vary somewhat in shape. The young are soon able to fly but must be looked after by the parents for several weeks. Having once raised a brood in a favorable locality, the birds seldom fail to return the following spring, and very often, if undisturbed, will use the same nest for several years. Each pair of birds seem to mate for several years, and although many young birds are raised every year, I have never noticed any perceptible increase in their numbers. They leave for the extreme South late in the fall, after a few month's revelling in the death and destruction of many of our smaller birds to allay the hunger of their young. As far as killing small birds is concerned, I believe it to be far worse than the Sparrow Hawk (*TIMINCULUSSPAVERIOUS*.) The White-rumped Shrike can hardly be distinguished from its relations, the Loggerhead Shrike (*LANIUS LUDOVICIANUS*), of South Carolina and the other more southerly states, and the Great Northern Shrike (*LANIUS ROREALIS*), of Canada and the far North. The only difference

between them when seen at a distance seems to be the size. South he has gone, and there he will remain until the sun again crosses the line and spring returns.

GEO. H. SELOVER,
Lake City, Minn.

A CURIOUS FREAK OF A SPARROW.

The most curious freak of the English Sparrow that has ever come under our notice is this: In the fall of 1880 ye editor and a friend were passing along the outskirts of a piece of timber when we came upon a number of Sparrows feeding upon the seeds of the golden-rod. Our friend picked up a small stone and hurled it at the birds, knocking one of them over. We hurried to the spot where the Sparrow had fallen, and taking him up we wet his head and poured a little water down his throat, which soon revived him. He now seemed very lively, and as we had no desire to keep the little pest, we tossed it up in the air, whereupon it darted about four rods away, when it suddenly wheeled around and flew swiftly back to us, we catching it with both hands as one would a ball. We unclasped our hands but he seemed to have no inclination to go, we therefore put him in our pocket and carried him home, where he lived in peace and plenty for about three months, when he finally fell a victim to the carnivorous appetite of a pet cat.

C. R. Orcutt, San Diego, Cal., has our thanks for a number of copies of the West American Scientist.

Geologists in quest of good fossils should not fail to take notice of Mr. Thompson's advertisement.

LITERARY NOTES.

The Hoosier Naturalist comes as ever laden with good substantial reading.

Random Notes still holds its own as a first-class natural history journal.

What has become of the Standard Directory and A. E. Southworth & Co.?

Prof. A. E. Foote, Philadelphia, has our thanks for a number of his excellent Naturalists' Leisure Hour.

The Sunny South Oologist is another good paper which has recently made its appearance.

The Young Naturalist, York, England, still continues to be one of the most welcome of our exchanges.

The Ornithologist, Twin Bluffs, Wis., and the Collector's Monthly, Philadelphia, have suspended publication.

The "Briefmarken Zeitung," Frankfurt-on-Main, Germany, to hand. It is a neat and tasty journal, devoted to stamps and stamp collectors.

The most handsome and interesting natural history paper yet received by us is the Ornithologist and Oologist, Frank B. Webster, publisher, Boston.

The Naturalist's World, Ilkley, England, comes to hand brim full of interesting and instructive reading. We wish it the very best of success.

We are sorry to learn that Mr. Oliver Davie has met with a disaster in having the plates for his Egg Check List destroyed by fire. This will necessarily delay the work for a couple of weeks at least.

Geo. N. Beard, 1657 Mission St., San Francisco, Cal., has presented us with a neat little 10-page catalogue of the prices paid for birds' eggs. Price five cents. Thanks!

Dawn of Day has added a natural history department. Good!

On account of the serious illness of the editor, Youth's Golden Hours was obliged to discontinue publication for a short time, but now that Mr. Burns has recovered, the publication will be resumed.

Why did Tidings from Nature lose its handsome cover? Well, Bro. Downs, though we regret the loss of that cover we cannot help but admire your most excellent paper. Long may you live and prosper.

S. Jacob, naturalist, Newport, R. I., has our thanks for a handsome 30-page book entitled "The Student's Aquarium." Price, 25 cents. Send for one; it is worth four times the price asked.

The Collectors' Science Monthly is a new paper just to hand. It has a fine illustration on the first page, but we doubt its success as a natural history journal so long as it devotes the greater part of its pages to stamps, coins and advertisements.

In the water of Salt Lake a bather can lie on the surface of the water without any exertion whatever, or by passing a towel under his knees and holding the two ends he can remain in any depth of water kneeling, with the head and shoulders out of water, or by shifting it under the sole of the feet he can sit on the water. The one exertion, in fact, is to keep one's balance; none whatever is required to keep afloat. The only danger, therefore, arises from choking by accidentally swallowing some of the water, for the strength of the brine is so intense that the muscles of the throat are convulsed, and strangulation ensues.

BIRD ARRIVALS.

The following is a list of the arrivals of birds in this vicinity, taken from personal observations. We do not claim, however, that these are the dates on which the birds first arrived, but are the dates on which they were first seen by us. Would it not be a good idea for our readers to take similar observations and send the same to us for publication in our Correspondence column?

March 17th—Robins and Bluebirds made their first appearance to-day.

March 20th—Meadow Lark heard in the fields to-day.

March 21st—Song Sparrows plentiful; seen a flock of Brewer's Blackbirds; one Red-shouldered Hawk; Shore Larks plentiful; one Killdeer Plover.

Crows, Woodpeckers and Creepers were very plentiful during the entire winter.

PUBLISHER'S NOTICE.

Necessity compelled that we issue the February and March numbers combined, in order to catch up. Now that we have accomplished this end, we intend hereafter to be on time, come what may. We know that we have very ungratefully neglected our paper and our subscribers in the past, but we now sincerely promise to amend our ways, and in the future to issue a paper second to none. We will probably enlarge with the next issue, and shall, as heretofore, use illustrations. We have also secured a number of first-class writers, who will endeavor to instruct and entertain all who cast their lot with us. Our subscription price is low and within the reach of all, and we now ask for the co-operation of all per-

sons interested in this kind of science—Natural History—to aid us in placing the NATURALISTS' COMPANION in the front rank of scientific journalism.

FOSSIL FERNS.

Thinking an article on the fossil ferns of this section might be of interest to your many readers, I will begin by stating that this famous fossil bed is in Grundy County, Illinois. The bed is about three-fourths of a mile long, and situated in the bed of a creek. The fossils are about twenty feet from the surface, imbedded in steatite, inside an iron-stone nodule, shaped like a kidney. On being broken open the fern, plant or animal remains are beautifully traced, nearly equal to life. I believe there has been between three and four hundred species classified from this locality. The more common are *NEUROPTIRIS HIRSUTA*, *PECOPTIRIS MIXTA* and *PECOPTIRIS VILLOSA*. Owing to constant collecting for many years, fossils are becoming quite difficult to obtain. Another drawback is that a few individuals are trying to control the entire ground for money-making purposes, and asking outrageous prices for the fossils; and having bought the sole right to collect, keep many enthusiastic collectors at bay.

O. D. WALBRIDGE,
Marseilles, Ills.

Mr. Kraus's "Biography of Darwin" contains a number of the naturalist's letters.

Professor Oscar Schmidt, the great zoologist, is dead at Strasburg, age sixty-four years. He was the first to discover in Goethe's writings that poet's affinity with the later teachings of Darwin.

The Naturalists' Companion

AN ILLUSTRATED MONTHLY
PUBLISHED IN THE INTEREST
OF NATURAL HISTORY.

EDITED and PUBLISHED

—BY—

CHARLES P. GUELF,

BROCKPORT, - N. Y., U. S. A.

We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

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RANDOM NOTES.

The next number will come out in an entire new dress.

We extend our sincere thanks to J. H. Paul, London, also Geo. H. Boxall, Buffalo, N. Y., for favors conferred.

“I’m going egg collecting,” said the tramp, as he proceeded toward a hen-house.

For the benefit of our readers we have added a Supply Department to our establishment, where we shall be pleased to supply the wants of our brother naturalists, and shall from time to time offer immense bargains through the columns of our paper.

Mr. Harry F. Thompson, former publisher of the Hoosier Mineralogist and Archæologist, has kindly volunteered his services as an editorial writer, and those of his old subscribers who are numbered on our list will now have the pleasure of perusing articles from his pen. As a writer on archæological topics we believe he is unexcelled.

Collectors, spring is coming; be prepared for the event. Egg collectors will soon rejoice, for they can add to their collections, and so will collectors of all natural history specimens. Archæologists will soon be able to roam over new plowed fields. Mineralogists visit quarries. Soon all collectors will collect to their “heart’s content,” as the old saying tells us.

The ignorance of many people on archæological subjects is so apparent that in many cases there is no need of it, for the literature on the subject is multiplying, and though most of this literature is intended for the scientific public, yet there are works which are written for the masses, and they should be in the hands of the masses. An instance in regard to the public’s ignorance will show that this subject should be made more clear. Some people believe that arrow-heads and axes are the production of lightning and thunder. How absurd, yet such is the case.

In our next issue we propose to begin a serial on "Eggs and Egg Collecting."

See Bennett & Dean's "ad"; send cash, and excellent goods obtain.

German geologists estimate that the Dead Sea will be a mass of salt a thousand years hence.

One firm in Germany has made and sold, during the last five years, 3,000,000 thermometers.

Send for a copy of the Young Naturalist to 18 Winthrop Place, Chicago. It's a daisy, and full of illustrations.

The Young Ornithologist, of Boston, continues to improve with each issue, and contains some very good articles.

As may be seen we have added a correspondence department to our paper and sincerely hope that our readers will come forward and support it.

Publishers who have not already had their publications entered on our Subscription Agency list, should do so at once, as we shall strike off some printed lists very soon.

Those of our readers who are interested in egg collecting and who wish to procure some English eggs should write Mr. Jefferys, Tenby, England, for his lists. His prices are way down and sure to please you. Collectors now have a chance to correspond with a prominent English collector and dealer and secure some rare bargains. See his advt.

It was with utter disgust that we read an article in a local paper to the effect that a Paris lady (?) recently appeared at a party in a dress made of the skins of 1000 humming-bird's. Any woman who will deliberately murder 1000 of nature's beauties to adorn (?) her clothing is not fit for comparison with the lowest and meanest of brutes.

We extend our hearty thanks to F. C. Johnson, of New York City, for invaluable aid rendered in identifying specimens.

Any one sending us five cents in silver and the names and addresses of ten of their friends who are interested in natural history, we will send this magazine three months free. This offer holds good until May 1st, only.

In this number we publish from the pen of Prof. Jenner, of this place an account of a fish of most wonderful characteristics and behavior. But because the article is entitled "A Fish Story," or for no other reason need our readers doubt its entire truthfulness, for the writer is as well known for strict integrity as for scientific ability, which is above question.

Parties having first-class birds' eggs, minerals, fossils, insects, Indian relics, moths, butterflies, skins, marine curiosities, scientific books or instruments, chemicals, shells, botanical specimens, cocoons, nests, woods, etc., etc., etc., for sale or exchange will please quote us the lowest possible prices, and also inform us what articles they can supply us with at wholesale. The prices must be very low in order to secure us as buyers.

Advertisers, in order to make an advertisement pay, must keep their goods constantly before the public. By so doing you impress buyers, and they give you a trial and if that proves what they expect it ought to, then they send you other orders. Advertisers are respectfully requested to try this publication, and we are certain that your efforts will be well repaid. Let your "ad." be for three months or six months, and you will find orders rolling in fast. Try it, for it works like a charm.

Study your collections, for by so doing you become acquainted with the works of nature and it gives you enthusiasm to add to, and obtain for your collection many new specimens. Become acquainted with the surroundings of your own city, and specimens which you find at home, though they are trite to you, yet to brother collectors they may be rare, and in demand by them. Yes, study your collections.

A society taking its name after the great naturalist, J. J. Audobon, has been established for the purpose of fostering an interest for the protection of wild birds from destruction for millinery and other commercial purposes. Headquarters of the Society are at 40 Park Row, New York City. It invites the cooperation of persons in every part of the country.

Brother editors will please copy the above, and let the good work progress.

Away down in the southwest of Nevada there is a remarkable cave in the side of the mountains. Near by a little rill of water pours down the slope, soon to be swallowed up by the thirsty soil. The broken-off shafts of arrows are seen sticking in the soft rock that constituted the roof of the cathedral-like dome. It is said that many years ago a party of the race of Shoshones were driven into this cave by their hereditary enemies, the Piutes. Their defence was so stubborn that the council was called, and the peace made was to last so long as a single arrow remained imbedded in the rock overhead.

The principal astronomical event in 1886 will be the total eclipse of the sun on the 29th of August. The line of totality in this eclipse will cross the Atlantic Ocean, traversing the West Indies

just after sunrise and in South Africa towards sunset. On the coast of Benguela the total phase lasts nearly five minutes, and at Grenada, in the West Indies, the duration will be nearly four minutes. Three comets of known period are expected to return during the year. Olbers' comet, with a period of seventy-one and a half years, will probably reach Perihelion near the close of the year. A small comet discovered by Pons in 1819, and rediscovered by Winnecke in 1858, is due in 1886, as is also the one first seen by Temple in 1869, and again observed by Switt in 1880. The period of each of these two comets is about five and a half years.

Parties in want of first-class job printing at very low prices should write us for estimates before sending elsewhere.

A "SERPENT MOUND."

In the New York World some time since then appeared an article on the archæology of Randolph, N. Y. Mention was made of a "serpent mound." This appeared to the writer as an important discovery, and in order to obtain the most accurate and trustworthy account of this mound, we wrote to Prof. F. Larkin, of the above named village and the author of "Ancient Man in America." This gentleman kindly answered by saying that the article was not reliable, and that the supposed "serpent mound" is nothing but a drift deposit with some what the appearance of a serpent. Prof. Larkin further said that he had no knowledge of any "serpent mound" in that section of the country. As Prof. Larkin remarked, "we want the exact truth." This we must have in archæological researches. H. F. THOMPSON.

CORRESPONDENCE.

On the 11th of February I found a nest of the Texan Screech Owl in which were a set of five eggs.

GEO. J. BENSON, Galveston, Texas.

Last spring I found a Crow's nest containing eight eggs. Is not that an unusual number? H. CONKLIN, Erie, Pa.

Yes, it is. Five eggs compose a set.

On the 10th of last June I found 37 Indian arrow-heads, 8 spear-heads and a hatchet, besides numerous fragments of pottery, while collecting near this place.

F. N. BATH, Carlisle, Penn.

The winter of 1880-81 I secured 123 cocoons of the *Promethea* moth, 87 of the *Polyphemus* moth and 62 of the *Cecropia* moth, nearly all of which hatched. A. G. KING, Brockport, N.Y.

I always go collecting ground-birds' eggs on a rainy day, as the birds are always on the nest then, and when flushed fly directly from it.

FRED S. HUNTER, Geneva, N. Y.

While out collecting last spring I found a Yellowbird's nest about half a foot high, containing five fresh eggs. Some time later I took the nest a part to find the cause of its being built so high. I found that it was composed of two separate nests, one being built upon the other. In the lower nest I found one Yellowbird's and three Cowbird's eggs. C. S. MINTEN, Oneida, N. Y.

We hope our readers will not be backward in contributing to this column as it is our desire to make it the leading feature of the paper. Make the notices as brief as possible, and to the point. There is no reason why our readers should not find plenty of notes to send in as it is now coming on the collecting

season when they will discover many curious objects worthy of mention in these columns. Let us hear from you all, both great and small.

FRAUDS.

Beware of E. G. Harlow, Lynn, Mass. This person is the lowest and meanest of frauds and should be shunned by every honest collector. We sincerely regret that we have been "taken in" by him and allowed his advertisement to soil the columns of our paper. We hope none of our readers have been swindled through it, yet should they have had that misfortune they will confer a favor on the editor by giving him the particulars. We will be more on the alert for such vultures as he in the future.

Publishers, beware of A. H. Hammond, Wareham, Mass., and Paul Goldsmith, Oakland, Cal., they are advertising dead beats.

Subscribe instantly.

Read all the advertisements this issue and see if there is not something you need to complete your collections.

The coming agent of power, is natural gas. This is to be the power of the nineteenth century's industry. The regions of New York, Pennsylvania, West Virginia, Kentucky, Ohio, Indiana, Illinois and Michigan are daily producing new "wells." In Indiana especially, the capitalists are taking hold of this matter, and wells are to be drilled in various parts of the state just as soon as the weather permits. New York, as all know, has long used natural gas as a heating agent, even as early as 1824, when the village of Fredonia used it as such.

HISTORICAL GEOLOGY.**A SERIAL.**

BY FRANKLIN C. JOHNSON.

CHAPTER V.**III. CARBONIFEROUS AGE.**

This was the age of coal-plants.

During this age all our coal was made. True spiders, scorpions, insects, reptiles, etc., appeared in great numbers. The land was covered with a luxuriant vegetation. The tall trees of this age much resemble the ferns and herbs of a modern meadow. This age is divided as follows:

CARBONIFEROUS AGE.	3. Permian Period.
	2. Carboniferous Period.
	1. Sub-carboniferous P'd.

SUB-CARBONIFEROUS PERIOD.

This formation is found among the Appalachians; also in Iowa, Illinois and Mississippi.

During this period the land was largely beneath the sea, though not at a great depth. The limestone abounds with crinoids, and is often termed "crinoidal limestone."

Not much coal was made during this period.

At Pottsville, Pa., the foot prints of reptiles are found, some having a stride of thirteen inches.

CARBONIFEROUS PERIOD.

This formation includes nearly all the great coal beds of the world.

Plants are the most common fossils.

During this age the earth was covered with vegetation. The leading forms were tree-ferns, club-mosses and rushes. Ferns which now grow at our feet, then were mighty trees.

The LEPIDODENDRIDS, a gigantic club-

moss, was very abundant. They were from fifty to sixty feet high.

The CALAMITES were a kind of rush which grew to the height of twenty feet or more.

The SIGILLARIE was frequent in the great jungles of this period. They often grew to the height of sixty feet.

CONIFERS, or cone-bearing trees, are not uncommon.

The seas of this period abounded in crinoids, corals and fishes. The land had its insects, spiders and reptiles.

PERMIAN PERIOD.

This formation is found in Kansas and Texas.

Reptiles are numerous.

The coal had been stored in the earth before this period.

CHAPTER VI.**MESOZOIC TIME.**

This time has but one age, that of reptiles. It is divided as follows:

AGE OF REPTILES.	3. Cretaceous Period.
	2. Jurassic Period.
	1. Triassic Period.

These periods have never been fully separated in America.

The rocks of this formation are found along the Connecticut Valley. Also in New Jersey, Pennsylvania, Virginia, North Carolina, Colorado and Nevada.

The vegetation includes numerous kinds of ferns, conifers and calamites. But there were no forests of LEPIDODENDRIDS or SIGILLARIDS. In their place the OYAD appeared.

Birds and animals now appear for the first time.

The AMMONITES are plentiful. They had chambered shells like the ORTHOCERATITE.

The BELEMNITE is common. It is the

internal bone of an animal which much resembled our modern cuttle-fish.

But the gigantic reptiles which lived during this period are the most conspicuous fossils.

The *ICHTHYOSAUR* (fish-lizard) had a short neck, a long and large head, like that of a lizard, very large eyes, fish-like vertebra, and a trunk and tail like that of a quadruped.

The *PLESIOSAUR* had the head of a lizard, the teeth of a crocodile, the neck of a swan, the trunk and tail of a quadruped, the ribs of a chamelon, a vertebra as long as broad, and paddles like those of a whale.

The *PTERODACTYLE* (winged figure) was a flying reptile. It was much like a bat, but had hollow bones, like those of birds.

The *DINOSAURS* (terrible lizards) were land reptiles. They grew to the length of 25 or 30 feet.

The *LABYRINTHODON* was much like a frog, but of the size of an ox.

The *RAMPHORHYNCHUS* is a curious reptile. It resembles a bird in various ways.

In the Connecticut Valley beds, many foot-prints of birds and reptiles are found. Some are of great size.

CRETACEOUS PERIOD.

This formation extends along the Atlantic coast from New York to South Carolina, and along the Gulf of Mexico to Texas, and from there northward to the Rocky Mountains, and westward to the Sierra Nevada.

The chalk-cliffs of Dover are of this formation.

Palms appeared during this period.

Reptiles are still plentiful.

The *CIMOLIASAUR* and *ELASMOSAUR* were large sea-serpents, often forty feet in length.

The *MOSASAUR* was a large whale-like

animal, from 15 to 75 feet in length.

Crocodiles were now very abundant.

Large turtles have been found. One from Kansas was fifteen feet in breadth.

TAXIDERM.Y.

A serial on preparing and preserving animals, birds, reptiles, insects, etc., etc.

LOBSTERS AND CRABS.

Lobsters and crabs are easily preserved, although in some species it is quite difficult to preserve their color. Separate the body at the joint nearest the head, and remove all fleshy matter the separated parts may contain. The flesh can be removed from the claws by making a small round hole on the under side with an egg drill and extracting the contents with a hooked wire. All fleshy matter, including the eyes, being removed, the shell should be thoroughly washed in cold water and arsenic applied to the interior. The two separated parts are now cemented together, and after being properly mounted it is placed in a cool dry room, out of the sun's rays.

The following is a good recipe for making a cement well adapted for the use of the naturalist in attaching different objects, especially shells, to pasteboard, and for mending broken specimens.

Fine Whitening, 2 oz.

Gum-Arabic, 2 oz.

Finest Flour, $\frac{1}{2}$ oz.

Ox-Gall, a tea-spoonful.

The whole to be dissolved, and mixed well with water into a thick paste.

We would like very much to have our taxidermy friends contribute to this department.

OUR AGENTS.

The following persons are authorized to receive subscriptions and advertisements for this paper. We will give a very liberal commission to persons who will act as our agents. Write for circulars and terms.

C. I. Walker, Summerville, S. C., R. W. Ford, Bristol, Ct., G. H. Selover, Lake City, Minn., Burt Longyear Leslie, Mich., W. R. Lighton, Creston, Ia., A. C. Randall, 81 Railroad St., St. Johnsbury, Vt., G. N. Beard, Mission St., San Francisco, Cal., Bennett & Dean, Cortland, N. Y., A. F. Clark, 414 Orleans St., Keokuk, Ia., J. M. Beers, 126 E. Water St., Elmira, N. Y.

Should we have failed to insert the names of any of our agents in this list, or have neglected to send the necessary circulars and sample copies. We wish such persons would inform us at once, as we have lost our agent's list, and therefore cannot ascertain to whom we have furnished supplies.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

F. C. JOHNSON, 243 W. 123 Street, New York city.—Books, minerals, fossils and a pair of good ice-skates, size 9½, (have been worn but once) for books on amateur photography or natural history.

CHAS. P. GUELF, Brockport, N. Y., U. S. A.—5 Vols. Golden Days, an accordion, and a book entitled "Young Trail Hunters," for all kinds of natural history specimens, or scientific books instruments. Correspondence desired with collectors in foreign countries for the purpose of exchanging specimens. Send list of specimens for exchange.

G. F. GUELF, Brockport, N. Y.—A violin and bow, in good condition, for the best offer in birds' eggs.

F. N. MASSOTH, JR., Hanover Centre, Ind.—Will exchange story and other books, natural history and stamp papers, old coins and other goods, for minerals, fossils, birds' eggs, curiosities, stamps, types, Indian relics and shells. 25 foreign stamps for every match, medicine, playing card or official stamp received, or for eagle or large copper cents.

ABNORMAL EGG.

A hen's egg, a little while ago, was observed to have another complete egg within it. Being asked for an explanation, Prof. Huxley replied—"It is very simple. Reversed peristaltic action takes place in the oviduct after the shell is formed, the egg is driven back, and when again descending gets a coat of yolk, albumen, and shell." Five similar eggs are described also in the catalogue of the teratological series of the Royal College of Surgeons. In the case of canaries, two such occurrences are recorded; in one of which three birds were actually hatched from two eggs, and in the other case five birds were hatched from four eggs.—A. W. Harrison, in NATURALIST'S WORLD.

Subscribe and Advertise now!

We are greatly in need of some MSS. for this paper. Will our readers kindly furnish us with some.

Hereafter we do not propose to try to crowd a whole newspaper into an inch advertisement.

We cannot supply OUR AGENTS with sample copies this month, as we have now more orders than can be filled.

QUERIES and ANSWERS.

G. S., Circleville, Texas.—The mineral sent for identification is calcite, while the fossil is a *HOLASTER ELEGANS*, of the Cretaceous Period.

W. H. P., Cincinnati, O.—We thank you for your kind suggestion but think it would hardly pay at present. We may, however, act upon it sometime in the future if the young naturalists would take hold and help make it a success. Thanks for compliments.

H. P. M., Summerville, S. C.—We should infer from the description of the egg given that it is that of the Black-billed Cuckoo; although we are not positive as you could nor describe the bird. Send egg and necessary stamps, if its return is desired, and we will identify it positively.

Life in the arctic regions, as described by one of Prof. Nodenskjold's companions in his late expedition, presents somewhat different experiences from his usual pictures of existence in these latitudes. Some of the expedition stopped at Walgatz island, and Dr. Nathoist tells how they walked about in their shirt-sleeves on the slopes covered with plants and shrubs, with butterflies and bees swarming around. 'Sometimes the heat was so great that one would have been satisfied with less in many a summer home. We richly enjoyed a bath in the spring. The mosquitos were annoying, so that we had to use both netting and gloves. Every day brought us a rich harvest of petrifications of tropical plants, such as figs, plantains, magnolias, etc., and while at work on the slopes we could feast our eyes on the innumerable icebergs around us of every variety of shape.'—Herald.

ARCHÆOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Del., to whom all articles pertaining to the subject should be addressed.

PEABODY COLLECTION OF RELICS.

Dr. C. C. Abbott's collection of stone implements of the American Indians in the Peabody Museum of Archæology, at Cambridge, Mass., is considered one of the most important of the kind ever brought together, and one which Archæologists will consult for all times to come. It contains more than 20,000 stone implements, and several hundred objects made of bone, clay and copper, and was gathered almost wholly in the neighborhood of Trenton, N. J.

THE WAR POINT

I find that many young collectors are puzzled over the war-point. When they obtain one they do not know what it is, and exchange or pass it off as they do the more common arrowheads. The war-point is a three-cornered arrowhead without a shank. The shaft of the arrow was split, the war-point inserted and then wrapped with the sinews of the deer. The first impulse of the person shot was to draw out the shaft, which always left the point to work its way in. As poisoned points were used, it can be supposed that the wounds always proved fatal. The war-points are of benefit to the Archæologist, as in many cases they determine the locality of ancient battle-fields. Imperfect specimens are quite common, but fine perfect ones are extremely rare, owing to their being so easily broken.

OUR ANCESTORS.

Were the many flint and stone relics which are constantly coming to light in various part, of the country, to speak one word of their history, what a world of doubt and wonder would be removed from the minds of our archæologists and writers. Historians tell us of the people a few centuries back, their customs and modes of living, warfare, etc., but beyond this we have no concise records of the men who had their rude dwellings in the cliffs and mounds which dot the country here and there with their curious and fantastic shapes. These with their contents of flint and stone relics, arrowheads, broken pottery and other rude objects, are all that is left to tell the tale of the past. Many eminent writers and historians have given these subjects special study ; some attributing these mounds and relics to the present American Indians, or rather their forefathers, and some to the work of an entirely different race, who occupied this continent at a time many years before the Indians. Later periods of history has left some discernable traces whereby to trace them, their legends, historic monuments and obelisks and other works give us some idea of the people who then existed. The various Roman coins and antiquities now being unearthed at Rome and Pompeii, together with their historic manuscripts, etc., give a fairly clear idea of the people who used them. We also have writers of these ages who, so to speak, pass their reports down to their successors, and in this way give us such information as we could in no other way obtain. But in the case of these historic mound-builders, the rude and quaint relics constantly coming to light are the only remains of an extinct

people. What they were and how they lived is an unexplained mystery ; and having no writers in that period, we are completely at loss to understand the wonders enclosed in these mounds, and only these rude reminders serve to tell us what little they can of a barbaric people who no longer tread their quaint mounds, but have past into eternity. The many quaint and curious carvings show a special talent of their race to this peculiar, and to the true archæologist, beautiful work ; and yet how little interest is felt or displayed in this, the study and history of our ancestors ? Comparatively little. Beyond the line of common people there are to be sure many eager and earnest workers who devote the greater part of their lives to the unraveling of these great mysteries, and what thanks do they get outside of their own circle of archæological friends and fellow thinkers ? The busy world rolls on, heedless of their endeavors, deigning but a passing glance at their relations and then moving on. Although the question will probably never be fully settled, there can be none too much interest displayed in it, and would that more might give their services to the cause and help advance the noble work of American Archæology.

J. E. JONES,
St. Johnsbury, Vermont.

ARTIFICIAL CORAL.—Twigs, raisin stalks and any objects having the general outline of branched coral may be made to resemble that article by being dipped in a mixture of 4 parts resin, 3 parts beeswax and 2 parts vermilion, melted together and thoroughly mixed. The effect is very pretty, and for ornamental work such imitation coral is very useful.

THE HOOP-SNAKE.

In the January number of this paper we published an article requesting any of our readers who had ever seen a hoop-snake to give us the particulars. A number of scientific journals have made similar requests, with the desired of learning to a certainty whether in reality such a reptile ever existed, but have not been very successful; a number of persons answering that they knew of people who had seen them, etc., but no one appeared willing to state that they themselves had seen one. The following answer which we recently received will certainly throw considerable light on the subject.

STEAMBOAT ROCK, IA., March 28, '86
Mr. C. P. Guelf.

Dear Sir:—

The inclosed request found in the NATURALISTS' COMPANION for January, I can answer, as I have seen two hoop-snakes in north-western Arkansas, Washington county, in the valley of the White river. One of the snakes formed a hoop very nearly as large as a barrel, and quite as perfect in outline. As we approached, it rolled over the ground at a greater velocity than I had ever seen a snake crawl. The hoop formed by the other snake was not as large as that of the first. I stood within ten feet of the later, when a gentleman threw a large stick which struck it with great force, and it separated into about twenty-five pieces, or sections, as it were, almost instantaneously. This I could never have believed, had I not seen it with my own eyes. The reason I knew them to be hoop-snakes was because they formed perfect hoops.

Yours very respectfully,
Miss Clella Waite.

A LARGE COLLECTION OF EGGS.

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Cedarbird,	10	Song sparrow,	05
Barn swallow,	04	Black-billed cuckoo,	20
Crimson house finch,	15	Cooper's hawk,	35
American goldfinch,	04	Red-shouldered hawk,	60
Grass finch,	06	Killdeer plover,	25
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Cowbird,	02	Nighthawk,	35
Yellow-headed blackbird,	15	Rufous hummingbird,	75
Baltimore oriole,	08	Allen's hummingbird,	75
Purple grackle,	04	Rose-breasted grosbeak,	25
Burrowing owl,	50	Yellow-winged sparrow,	35
Western lark finch,	30	Yellow-throated vireo,	35
Blue jay,	10	Red-eyed vireo,	10
Shore lark,	35	Western warbling vireo,	25
Kingbird ; Bee martin,	05	Rough-winged swallow,	25
Red-headed woodpecker,	15	Green-backed goldfinch,	30
Yellow-shafted flicker,	06	Golden-crowned thrush,	15
Yellow-billed cuckoo,	15	Prairie warbler,	50
Pewee,	06	Californian Benwick's wren,	35
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English sparrow,	02	PRICE-LIST CONTINUED ON BACK OF COVER.	

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Vol. III.

OCTOBER, 1897.

No. IIII.

ONE SMALL PIECE OF GROUND.

BY BURTIS H. WILSON.

Paper read before the Third Congress of I. O. A.

THE number of birds that may be found in a small area is legion—provided the character of the ground is sufficiently varied. In the northern portion of the city of Davenport, Iowa, just outside the thickly settled district, is a piece of ground, about two acres in extent, belonging to a florist, who, for several years, has not taken the care of his grounds that he did when he was young and doing a flourishing business. The grounds are divided nearly in half by the greenhouses which extend from east to west. Let us look first at the southern half.

From the green houses the land slopes toward the south-east the extreme corner being cut off by a little creek. This little corner is filled with a grove of small maples. From the creek to the southwest corner, the fence is lined with bushes and small trees, as is also the fence on the west side. North of the greenhouses the land is different. The north end fence is overgrown with woodbine and raspberry vines; next to it stands a "wind-brake" of several rows of maples, very close together and very tall, running the whole width of the grounds. Then at short intervals south of these trees are rows of small trees of many varieties, overgrown with vines, blackberry bushes, rows of currant bushes and flowering shrubs. Only the extreme half of the northern part of the ground is thus covered, the part next the greenhouse being devoted to flowers.

Taken as a whole these grounds are a paradise for birds, such as the Thrushes, Jays, Warblers, Vireos, Flycatchers, and above all the *Fringillidæ*. In the migrating season, hosts of Sparrows of all kinds, White-throated, White-crowned, Chipping, Field, Tree, Song, Swamp, Fox and the English Sparrows, Chewinks, Goldfinches, Grosbeaks, Purple Finches, and many others abound here. Among the rarer visitors during the migrations, I have noted one Harris' and one Clay-colored, both being seen in the bushes at the north end. The "windbrake" of maples is the home of many Woodpeckers, especially the Yellow-bellied, during the migrations. At one end of the row stand two or three evergreen trees with their bark pitted all over by these birds. Around the evergreens is a mat of berry bushes which is always full of birds. Among these maples, one spring, I flushed a Whip-poor-will several times and as this bird is quite rare here, I considered it quite a find. Blackbirds and Orioles are

very abundant, the former especially so in the spring. Among the thickets the Screech Owl finds seclusion by day and a plentiful supply of birds and field-mice at night. Here also the Great Northern Shrike makes his winter home and is always sure of a Tree-Sparrow, or if he goes into the next field he may vary his diet with a Horned Lark for dinner. In the little grove of maples at the south-east corner I flushed a Woodcock several times one hot afternoon in August. Here, too, I have seen a Marsh Hawk, and in one of the plumb trees near the south fence a Green Heron once ventured to alight. Speaking of Herons reminds me that I once saw a Night Heron alight in the top of a large boxelder standing by the little creek and about a hundred yards south of the little grove of maples. And also that during the migration one spring a boy found an American Bittern sitting in a brush heap just back of a house not more than a hundred yards south-west of the place I have been describing. The Bittern allowed itself to be captured and placed in a cage where I saw it a few days later. I might also state that in the bushes and small trees across the road and not a hundred feet distant from the small grove where I flushed the Woodcock, I have shot a Winter Wren, Long-billed Marsh Wren, Yellow-bellied Flycatcher and Black-billed Cuckoo. Furthermore, one very hot Sunday afternoon in July a Great Horned Owl, pursued by a mob of Blue Jays, paused for a few minutes in the top of one of the large maples which stand close by the florist's house.

These grounds furnished a good field for the Oologist. Here is a list of the birds I have found nesting on the premises and it is probable that this does not represent more than one-half the varieties which nest within its boundaries: Robin, Catbird, Brown Thrasher, House Wren, Turtle Dove, Bronzed Grackle, Baltimore and Orchard Orioles, Cedar Bird, American Goldfinch, Rose-breasted Grosbeak, Field and Chipping Sparrows, Yellow-bellied Cuckoo, Black-capped Chickadee, Bell's and Warbling Vireos, Yellow Warbler and last, but not least common, the Cowbird. I have seen the Maryland Yellow-throat with a worm in its bill and very much excited by my presence but was unable to find the nest. I give here a few notes from my journal:

1. May 22, 1895, Chickadee's nest, three highly incubated eggs, three feet from the ground in a hole in a rotten stump.
2. June 7, 1896, Orchard Oriole's nest, three fresh eggs, also one egg of the Chipping Sparrow. Nest twenty feet up in a Lombardy poplar, lined with hair like a Chipping Sparrow's.
3. May 27, 1891. Field Sparrow, three eggs of the Sparrow and two of the Cowbird. Nest on the ground under wild parsnip.
4. June 16, 1891, Bell's Vireo, four eggs. Nest three feet from the ground in a currant bush.
5. August 19, 1892. Yellow-billed Cuckoo, two eggs. Nest ten feet up in a maple sappling covered with grape-vines.

In another small maple sappling, a friend of mine once found a Goldfinch's nest containing spotted eggs.

These are only a few of the many notes I made in these grounds. Surely

this was a paradise for the small birds. I say was for the florist has at last had the place cleaned up; trees, bushes and vines cut down or trimmed and, since the place has returned to civilization, no more shall I visit it,*for with the removal of the wild growth the most of the birds have also gone.

DISCUSSIONS.

MR. J. H. BROWN says he has visited the place of which Mr. Wilson speaks and it was indeed "a paradise for birds." But at the present time the place has been cleaned up and divided up and sold and now new buildings are being erected on the grounds.

Mrs. Triem speaks of a beautiful sight which she has visited; a valley where there are an immense number of birds, especially during the migrating season. [Perhaps Mrs. Triem can, in the near future, give us an extended account of her experiences and finds in this valley. Ed.]

The fact that the White-crowned Sparrow is abundant near Davenport and quite rare at Burlington was mentioned by Mr. Brown, but he could give us no satisfactory solution of the question "why this was so?" He also thought that possibly the Chipping Sparrow's egg found by Mr. Wilson in an Orchard Oriole's nest, might have been a runt egg of the Oriole, as he has found a set of four of the Oriole's eggs which were no larger than Chipping Sparrow's eggs. And again, from the fact that the nest had a lining of hair, it may have been first built by the Sparrow which laid one egg before the Oriole chanced along and took possession; the Oriole refitting the nest and laying her eggs without molesting the Chipping Sparrow's egg.

Mrs. Mary L. Raun asks if the Cowbird and the Cuckoo are the only birds that lay in other birds' nests.

Mr. Brown states that the Cuckoos do not lay in the nests of other birds. Simply the two species of Cuckoos—the Yellow-billed and Black-billed—will occasionally drop their eggs in the other's nest. Of this occasional freak, Messrs. Law, Brown and Savage have made authentic observation.

Mrs. M. A. Triem remarks that she has seen the House Wren sitting on a set of English Sparrow's eggs, but she did not have the opportunity of revisiting the place and making further investigation. Therefore, it may have been that this little inquisitive Wren found the Sparrow's nest when the owner was absent and thought she would try her skill at incubating *Passer domesticus* eggs. [I dare say that the Wren disappeared quickly upon the Sparrow's return. I do not attribute enough reasoning faculty to these impetuous foreigners for them to become successful parasites. Ed.]

Mr. J. Eugene Law spoke of the explanation of the "large sets," such as seven and eight eggs of the Crow, fifteen and twenty eggs of the Bob-white, as being the result of two females laying in the same nest. Probably this circumstance is indulged in by a much larger number of species and more often than

is usually supposed. He also mentions the late nesting of the Cuckoos, especially the Yellow-billed. He has found its nest with fresh eggs in as late as August 20th.* Mr. D. L. Savage brings the date to August 25th and Mr. Brown found in one tree, on September 4th, a Dove's nest containing two fresh eggs and just above it a nest of the Yellow-billed Cuckoo in which were three slightly incubated eggs. Mrs. Raun found two young Mourning Doves in a nest as late as September 14th.

The diet of the Shrike was quite thoroughly discussed. Mrs. Triem was not aware of their eating Prairie² Horned Larks, but had seen them catch Tree Sparrows. It was a unanimous decision that the barbed wire fences was a great boon to these birds; frogs, mice, Tree Sparrows and grasshoppers had been seen suspended from barbs. Mr. Brown finds the Loggerhead at Davenport in equal abundance with the White-rumped Shrike. There is some question about his statement. He says this is an opening for systematic investigation, there is room for opinions on both sides. A number of our Wrens and Flycatchers should receive special attention also.

Mrs. Raun was very glad that Mr. Wilson brought such an interesting subject before us, and she is going to make a list of the birds she finds in the lawn near her home and give to us at the next congress. That will be some systematic work.

In speaking of investigation on birds near town, recalls to Mr. Law some of his early experiences. For a month or more a flock of Evening Grosbeaks fed daily within the corporations of Perry, Ia. Our ornithologist at that place was very desirous of obtaining a number of specimens, so he would arise before people were awake and shoot once or twice—not often enough to arouse any disturbance—but continuing this a few mornings, the desired number of specimens were obtained. Mr. Brown was not energetic enough to follow the above prescription, but he, with Mr. Paul Bartsch, devised a scheme which worked successfully in Iowa City. A flock of birds—Redpolls—were feeding on the weeds along one side of the college campus, Mr. Brown secured an air gun and carefully discharged it at convenient intervals, while his co-worker in an unconcerned manner followed behind picking up the birds. A satisfactory number of Redpolls were secured. Not unfrequently this means was resorted to when rare birds were in the neighborhood and always with success.

Mr. Brown, while speaking of the rarer birds mentions the Red Crossbill. He thinks that it is possible that this species may be found nesting in the state in some of the wilder sections. Mr. Law saw three females in May at Perry, Iowa, and he has observed them in September; he also has seen a specimen of Evening Grosbeak in June, in Dallas county, but it was undoubtedly a lost bird.

The question is asked, "How many species of Juncos do we have in the state?" There is no positive answer to the question, but a number volunteer to make thorough investigation and undoubtedly this question will be cleared up before another congress. Up to date there are no authentic records of but one species being found—the Slate-colored Junco.

SUMMER BIRDS OF THE ONEOTA VALLEY.

(JUNE, JULY, 1895.)

BY PAUL BARTSCH.

Paper read before the Third Congress of I. O. A.

NATURE as if to show mankind what the conditions in that great fertile region traversed by the glaciers in the ice age, scarred, planed and covered by a morainic deposit, would have been; left untouched a strip of land extending over south-eastern Minnesota, western Wisconsin and north-eastern Iowa—a region wild, romantic and beautiful, the dream of our landscape artist, the paradise of our naturalist.

This region within our bounds is traversed in the northern portion by the Oneota river and its tributaries—it is the avifauna of this tract that I wish to consider in the present paper.

As topographic environment is one of the prime factors in the distribution of many of our birds, it will not be amiss to briefly consider this feature of our chosen field.

The Oneota, though not as active as during glacial and preglacial time, is nevertheless working slowly and diligently to lower its channel throughout most of its course. The lessened amount of water causes the stream to meander through a wide flood plane bounded everywhere by high ridges and bold bluffs. One may get somewhat of an idea of the amount of work accomplished by the stream in course of time, if he considers that it has cut a gorge through the various formations from the Trenton down to about 300 feet below the summit of the St. Croix sandstone.

The little tributaries have been equally busy and even now seem to try hard to cut down through the opposing rocks to keep on the same level with the river. Not always able to accomplish this in a uniform manner, owing to differences of rock texture, many beautiful water falls and cataracts have been formed in their course. Not unfrequently the gorge cut by some small rivulet has intersected an underlying water vein* and the additional force has helped to grind and cut deeper the lower course of the stream and now a beautiful water fall tumbles noisily from the cliff.

Throughout the course steep hills bound the valley on both sides. Frequently perpendicular cliffs rise almost from the water's edge to a height of several hundred feet and where the Oneota lime stone comes to the surface, bold, bared, massive battlements crown the summit of the adjacent hills.

The valley is wide,—the floodplane constitutes the farming land of the region. The current varies with the formation; at places it is slack, then again

* I particularly have in mind Seevers spring, some two miles south-east of Decorah.

it races along rapidly over a series of shallows, almost cataracts, and it is such places that make the river rather difficult to navigate in anything but a portable canoe.

* If one ascends one of the eminences he will notice a succession of ridges scattered irregularly, and generally separated by some tributary of the Oneota river. All these elevations are of about the same height, most of them with rounded top and abruptly sloping sides—typical features of a country long subjected to the agents of water and mechanical erosion. Frequently, however, tall buttes with rounded tops and steep boulder† covered sides can be seen, sentinels in the centre of the valleys.

The north-eastern slopes of all these ridges and buttes are covered by a mixed forest composed chiefly of burr oak (*Quercus macrocarpa*, Michx.) hichories (*Hicoria ovata*, Mill.) Britt. and glabra (Mill. Britt.) and not unfrequently we find white pine (*Pinus strobus* L.) balsam (*Abies balsamea* Mill.) and Juniper (*Juniperu virginiana* L.) striving vainly for supremacy with the deciduous forest.

On the slopes bounding the river in Winnesheik Co., and for a little way in Allamakee, the white trunks of the Paper Birds (*Betula papyrifera* Marsh.) vie with the glistening boulders for conspicuousness and it is indeed beautiful to see the contrast of the white in the dark deep green of its surrounding.

The valley still retains some of the old giant patriarchs of the forest as man's axe has spared many, not on account of sentiment or love for the beautiful, for that indeed stands little show when the almighty dollar is the other consideration, but rather of their distance from a convenient port or place where they might be turned into lumber, the younger timber being more desirable for fire wood.

Giant elms, bass-wood, maples, hickories and oaks form the bulk of the timber and occasionally a sycamore stretches its ghostly branches above the other vegetation.

It is in these sylvan dells, where underbrush is scanty, that the Cerulean Warbler informs us of his presence, and the soft gradually fading veery-veery-veery of the Wilson's Thrush is offset by the bell-like tones of our woodland minstrel the Wood-thrush. The plaintiff note of the Wood-pewee, the chip-churr of the Tanager and the daintily lisped song of the Redstart mingled with strophes from the Red-eyed and Warbling Vireo and harsher notes of the Flicker and Redhead greet you on all sides. The querulous rise and fall of the Blue-winged Yellow Warbler's song and an occasional chant of the Oven Bird not to be forgotten.

The reedy marshes with their lily covered lakes are choice places for the Red-winged Blackbird, Woodcock, Swamp Sparrow, Long-billed Marsh Wren, Killdeer and Plover, as well as the ever present Song Sparrow, the saucy

* View from bluff opposite "The Elephant," Sect. 32, Twp. 100, N. R. V. W., Allamakee county, Iowa.

† Boulders of disintegration not transportation.

Western Maryland Yellow-throat, together with a host of swiftly gliding Swallows, all bent upon the destruction of the luckless insect which may have stretched its wings for the first time in its first flight; emerging from the larval form and its watery home to an untimely death.

The notes given with the species in the following list were taken between June 11 and July 10, 1895, a time when most birds are stationary, i. e. the swaying back and forth of a few weeks previous to this date is practically at rest and most birds are intent upon domestic duties. It is therefore highly probable that most if not all of them breed within the area under discussion, though absolute proof is lacking in the majority of cases. I have noted in each case whether the bird was found in both Winnesheik and Allamakee counties or in only one of them:

(1)—*Larus philadelphia*. BONAPARTS GULL.

A small flock of these birds were seen skimming about the marshes near the mouth of the river. Allamakee Co.

(2)—*Lophodytes cucullatus*. HOODED MERGANSER.

Several of these birds were noted in the marshes near the Mississippi river. Allamakee Co.

(3)—*Aix sponsa*. WOOD-DUCK.

Several Wood-ducks were noted in our course down the stream and several more were seen in the locality cited for the Hooded Merganser. Winnesheik and Allamakee counties.

(4)—*Botaurus lentiginosus*. AMERICAN BITTERN.

A large number of these birds were observed in the marshes at the junction of the Chicago and Milwaukee R.R. and the Oneota river. Several were shot, among them a specimen which had lost one leg immediately above the tarsus. The birds undoubtedly breed here. Allamakee Co.

(5)—*Ardea herodias*. GREAT BLUE HERON.

Seen in the marshes near New Albin. Allamakee Co.

(6)—*Ardea virescens*. GREEN HERON.

Not a very common bird, but several were observed along the river—more plentiful as we approached the Mississippi. Winnesheik and Allamakee Co's.

(7)—*Philohela minor*. WOODCOCK.

This bird breeds at Decorah where I obtained several young. They were also met with in many other places farther down the stream and seemed to be fairly abundant,—perhaps there is little persecution from the sportsman which would account for their comparative abundance. Winnesheik and Allamakee counties.

(8)—*Actitis macularia*. SPOTTED SANDPIPER.

Very abundant throughout the range—young as well as old birds were seen

everywhere. Winnesheik and Allamakee counties.

(9)—*Agialitis vocifera*. KILLDEER.

This bird was noted in the marshes at Decorah and near New Albin and also in several places between these points. On one occasion at quite a distance from the water. Winnesheik and Allamakee counties.

(10)—*Colinus virginianus*. BOB WHITE.

The Pleasing call of this species greeted us from many a meadow and field in our journey down the steam. Winnesheik and Allamakee counties.

(11)—*Bonasa umbellus*. RUFFED GROUSE.

Very numerous throughout the valley. Many broods were flushed and young in various stages, from a few days old to half grown, were obtained. They seemed to prefer the brushy slopes but were also quite abundant in the timber of the valley. Winnesheik and Allamakee counties.

(12)—*Meleagris gallopavo*. WILD TURKEY.

A few stray feathers from wing and tail of this species were found in the more remote portions of the valley which would indicate their presence, though no birds were actually seen. Allamakee county.

(13)—*Zenaidura macroura*. MOURNING DOVE.

Noted on the sand flats along the river where they seem to come for sand baths. Winnesheik and Allamakee counties.

(14)—*Cathartes aura*. TURKEY VULTURE.

Quite common along the valley, especially where the Oneota lime stone forms the cap, in the crevices of which I suppose they find suitable breeding places. Winnesheik and Allamakee counties.

(15)—*Accipiter velox*. SHARP-SHINNED HAWL.

Common; breeds in the crevices in the cliffs. The young are very noisy and usually betray the nesting site by their notes. I examined one of these abodes several hundred feet above the river in the cliff adjacent to the Chicago and Milwaukee R. R. near its junction with the Oneota, a little south-west of New Albin (Iowa Bluff), and found numerous wings of the smaller birds, such as Warblers, Black Birds, Meadow Larks, Song Sparrows, Flickers, Robins, etc., etc., as well as some bones belonging to small rodents, *Spermophiles* perhaps, scattered about the crevice. The young were large enough to vacate the residence when I made my appearance (July 5, 1895) and I had to be contented to gaze upon the amount of mischief wrought by a family of these falcons. The Sharp-shinn surely has few redeeming features, when we consider the amount of havoc he causes among our small birds.

These birds were noticed to extend about forty miles up the valley and appeared to inhabit many of the exposures along the Mississippi valley as far south as Eagle Point Dubuque, where the last family was noted. Single birds were seen near Decorah, but no nesting site in cliffs was observed until we had

passed the boundary between the two counties. Winnesheik and Allamakee counties.

(16)—*Accipiter cooperi*. COOPER'S HAWK.

Apparently not so abundant as the foregoing, and confined more to the timber area. Three young and an addled egg were taken from a nest at Decorah. Winnesheik and Allamakee counties.

(17)—*Butes borealis*. RED-TAILED HAWK.

Quite common throughout the valley. Not a day passed but what a number of these birds were noticed. Several young and adults were shot from the boat. Winnesheik and Allamakee counties.

(18)—*Buteo lineatus*. RED-SHOULDERED HAWK.

By no means as common as the last. Allamakee county.

(19)—*Buteo latissimus*. BROAD-WINGED HAWK.

Several of these birds were seen but none secured. Winnesheik and Allamakee counties.

(20)—*Haliastur leucocephalus*. BALD EAGLE.

A bird, which I took to be of this species, was seen flying about a cliff on June 28th, in Allamakee county.

(21)—*Falco peregrinus anatum*. DUCH HAWK.

A pair of birds which I am inclined to refer to this species were noticed sporting about one of the steep escarpments. The graceful swift movements and size cause me to believe that it must have been this master, as he is the only one able to perform such feats of wing. Allamakee county.

(22)—*Falco sparverius*. SPARROW HAWK.

Not common in the valley proper; only a few observed and these frequented the more exposed situations. Winnesheik and Allamakee counties.

(23)—*Bubo virginianus*. GREAT HORNED OWL.

Quite common; a young bird whose head was still covered with down was shot. The birds keep close to the water and on several occasions I flushed them in early morning from fallen trees which extended into the water. The fact that this happened repeatedly led me to believe that Bubo might at times vary his diet by catching a fish. Is it not possible that the fish might be attracted by his glowing eyes? Winnesheik and Allamakee counties.

(24)—*Syrnium mebulosum*. BARRED OWL.

Seems to be more restricted to the hills and hill-sides. Winnesheik and Allamakee counties.

(25)—*Megascops asio*. SCREECH OWL.

The querulous wailing note of this bird was heard many an evening in our

course down stream. Winnesheik and Allamakee counties.

(26)—*Coccyzus americanus*. YELLOW-BILLED CUCKOO.

Quite common but shy. Winnesheik and Allamakee counties.

(27)—*Ceryle alcyon*. KINGFISHER.

Not very common but generally distributed throughout the valley. Winnesheik and Allamakee counties.

(28)—*Dryobates villosus*. HAIRY WOODPECKER.

Quite common throughout the valley; young and adults were obtained in Winnesheik and Allamakee counties.

(29)—*Dryobates pubescens medianus*. DOWNY WOODPECKER.

Very common everywhere. Winnesheik and Allamakee counties.

(30)—*Sphyrapicus varius*. YELLOW-BELLIED WOODPECKER.

Several families, old and young, of this bird were met with in the timber bordering the river. They seem to be partial to such locations as not a single bird was observed in any other place. Winnesheik and Allamakee counties.

(31)—*Melanerpes erythrocephalus*. RED-HEADED WOODPECKER.

A common bird in Winnesheik and Allamakee counties.

(32)—*Melanerpes carolinus*. RED-BELLIED WOODPECKER.

Not common and apparently restricted to the heavy timber. Winnesheik and Allamakee counties.

(33)—*Colaptes auratus*. FLICKER.

Common everywhere. Winnesheik and Allamakee counties.

(34)—*Antrostomus vociferus*. WHIP-POOR-WILL.

Judging from their notes, I should say that they were not very abundant. But this I believe is their silent season so the mere fact that they were heard will have to suffice for this record. Winnesheik and Allamakee counties.

(35)—*Chordeiles virginianus*. NIGHT HAWK.

Quite common in both Winnesheik and Allamakee counties.

(36)—*Chaetura pelagica*. CHIMNEY SWIFT.

Common everywhere and I believe careful search would reveal some primitive nesting sights in trees. Winnesheik and Allamakee counties.

(37)—*Trochilus colubris*. RUBY-THROATED HUMMING BIRD.

Very common in both Winnesheik and Allamakee counties.

(38)—*Tyrannus tyrannus*. KING BIRD.

Common in both Winnesheik and Allamakee counties. Nests were found at Decorah.

(39)—*Myiarchus crinitus*. CRESTED FLYCATCHER.

This bird frequents the wooded valleys where its noisy call betrays its presence oftener than the sight of the bird itself. Winnesheik and Allamakee Co's.

(40)—*Sayornis phæbe*. PHOEBE.

Very abundant; nests were found under bridges and one in an old stump. Winnesheik and Allamakee counties.

(41)—*Cantopus virens*. ACADIAN FLYCATCHER.

Quite abundant along the water courses. Winnesheik and Allamakee Co's.

(42)—*Empidonax virens*. WOOD PEWEE.

One of the most abundant summer residents. Its pretty nests were found in many places in both Winnesheik and Allamakee counties.

(43)—*Empidonax minimus*. LEAST FLYCATCHER.

These birds breed abundantly about Decorah where a number of nests were examined, some containing fresh eggs, some young. The nest is a beautiful structure built in the fork of some branch, usually only a few (6 to 15) feet from the ground. Winnesheik and Allamakee counties.

(44)—*Octoris alpestris praticola*. PRAIRIE HORNED LARK.

A few of these birds were observed in both Winnesheik and Allamakee counties. Usually their note, when on wing, notified us of their presence.

(45)—*Cyanocitta cristata*. BLUE JAY.

This noisy marauder was always present. Winnesheik and Allamakee Co's.

(46)—*Corvus americanus*. AMERICAN CROW.

Very common in both Winnesheik and Allamakee counties.

(47)—*Dolichonyx oryzivorus*. BOBOLINK.

Common in the rank meadows where the male pours forth his bubbling song, from reed or whilst he flutters in the air. Nests were found at Decorah. Winnesheik and Allamakee counties.

(48)—*Molothrus ater*. COW-BIRD.

Common in both Winnesheik and Allamakee counties.

(49)—*Agelaius phoeniceus*. RED-WINGED BLACK-BIRD.

Very abundant about the marshes, where a number of nests were found. None were placed more than four feet from the ground. Winnesheik and Allamakee counties.

(50)—*Sturnella magna*. MEADOW LARK.

Quite common in the fields of the valley. Winnesheik and Allamakee Co's.

(51)—*Icterus spurius*. ORCHARD ORIOLE.

Abundant; nests throughout the valley. Winnesheik and Allamakee Co's.

(52)—*Quiscalus quiscula aeneus*. BRONZED GRACKLE.

Common in both Winnesheik and Allamakee counties.

(53)—*Icterus galbula*. BALTIMORE ORIOLE.

By far not as common as the last. Winnesheik and Allamakee counties.

(54)—*Spinus tristis*. GOLD FINCH.

Very abundant and feeding, apparently, upon seeds of the thistle (*Cnicus lanceolatus*), only at this time. Winnesheik and Allamakee counties.

(55)—*Pooecetes gramineus*. VESPER SPARROW.

Next to the Song Sparrow, the most abundant summer resident. Breeds abundantly almost everywhere throughout the valley. The birds were in full song and would mount some stake or alight in a tree to deliver their pleasing notes. Winnesheik and Allamakee counties.

(56)—*Ammodramus savannarum passerinus*. GRASSHOPPER SPARROW.

The whirring note of this bird soon announced his presence and caused the death of several of them. Winnesheik and Allamakee counties.

(57)—*Chondestes grammacus*. LARK SPARROW.

Several of these birds were noticed on a bare hillside near a small stream. Allamakee county.

(58)—*Spizella socialis*. CHIPPING SPARROW.

Common, especially so about dwellings. Winnesheik and Allamakee Co's.

(59)—*Spizella pusilla*. FIELD SPARROW.

Common everywhere in Winnesheik and Allamakee counties.

(60)—*Melospiza fasciata*. SONG SPARROW.

By far the most abundant species throughout the valley. The song, though somewhat sleepy and not so varied as at an earlier period, was nevertheless very pleasant and it seems to me that not ten rods of ground were passed without hearing one or more of these birds.

(61)—*Melospiza georgiana*. SWAMP SPARROW.

Not very abundant; a number were seen in the marshes. They were shy and secretive. Winnesheik and Allamakee counties.

(62)—*Pipilo erythrophthalmus*. TOWHEE.

Very common on all brush covered hill sides. Nests were found in both Winnesheik and Allamakee counties.

(63)—*Zamelodia ludoviciana*. ROSE-BREASTED GROSBEEK.

Breeds commonly in both Winnesheik and Allamakee counties.

(64)—*Passerina cyanea*. INDIGO.

Quite common in both Winnesheik and Allamakee counties.

(65)—*Spiza americana*. DICKCISSEL.

Common in Winnesheik and Allamakee counties.

(66)—*Piranga erythromelas*.

Breeds abundantly in both Winnesheik and Allamakee counties. All the nests were placed in oak trees way out on the branches at varying heights.

(67)—*Progne subis*. PURPLE MARTIN.

Noticed about Decorah and New Albin and also about several of the farms between these two localities. Winnesheik and Allamakee counties.

(68)—*Petrochelidon lunifrons*. EAVE SWALLOW.

Common; several colonies were seen established on cliffs in Winnesheik and Allamakee counties.

(69)—*Chelidon erythrogaster*. BARN SWALLOW.

This graceful bird was met with everywhere. On one occasion a nest was found attached to one of the beams on the under side of a bridge. Winnesheik and Allamakee counties.

(70)—*Tachycineta bicolor*. WHITE-BELLIED SWALLOW.

Quite abundant along the river, more so in the marshy tracts. Winnesheik and Allamakee counties.

(71)—*Clivicola riparia*. BANK SWALLOW.

Nests commonly throughout the range. Winnesheik and Allamakee Co's.

(72)—*Stelgidopteryx serripennis*. ROUGH-WINGED SWALLOW.

The rarest of the Swallows. Winnesheik and Allamakee counties.

(73)—*Ampelis cedrorum*. WAXWING.

Quite common along the valley. Winnesheik and Allamakee counties.

(74)—*Lanius ludovicianus excubitoroides*. WHITE-RUMPED SHRIKE.

Not very common; frequents the more exposed situations.

(75)—*Vireo olivaceus*. RED-EYED VIREO.

This bird is very common in the Oneota valley and quite a number of nests were found. Winnesheik and Allamakee counties.

(76)—*Vireo gilvus*. WARBLING VIREO.

Not as common as the last. Winnesheik and Allamakee counties.

(77)—*Vireo flavifrons*. YELLOW-THROATED VIREO.

This species is rarer than the preceding two. Nests at Decorah. Winne-

sheik and Allamakee counties.

(78)—*Mniotilta varia*. BLACK AND WHITE CREEPING WARBLER.

Common in the wooded portions. Young and adults were obtained. Winnesheik and Allamakee counties.

(79)—*Helminthophila pinus*. BLUE-WINGED WARBLER.

Not common; frequents the moist wooded portions. Winnesheik and Allamakee counties.

(80)—*Helminthophila chrysoptera*. GOLDEN-WINGED WARBLER.

Rare. Only a single specimen observed in a ravine about a mile or so south of Fairport. This was a male in full song. I waited and watched him carefully for some time hoping to be able to detect a nest, but in this I was disappointed. Winnesheik county.

(81)—*Dendroica aestiva*. YELLOW WARBLER.

Breeds commonly in the willows along the the river. Winnesheik and Allamakee counties.

(82)—*Dendroica rara*. CERULEAN WARBLER.

Abundant in the heavy timber along the water courses. Winnesheik and Allamakee counties.

(83)—*Seiurus auricapillus*. GOLDEN CROWNED THRUSH.

Common; breed abundantly on the wooded hill sides. Winnesheik and Allamakee counties.

(84)—*Seiurus moticilla*. LOUISIANA WATER-THRUSH.

Common; young and old were obtained. It is a pretty sight to see the parents lead the young at the water edge, encouraging them to enter and wade and calling them in when the current has proved too strong and has carried the fluttering chap down a little ways. Winnesheik and Allamakee counties.

(85)—*Geothlypis trichas accidentalis*. WESTERN MARYLAND YELLOW-THROAT.

The most abundant of the Warblers. His lively which-e-ta, which-e-ta, which-e-ta, wit, was heard everywhere from the reedy marsh, as well as the bushy hill, and even the timber seems to furnish him a home in this region. Winnesheik and Allamakee counties.

(86)—*Icteria virens*. YELLOW-BREASTED CHAT.

This master singer is quite rare in the Oneota valley, only a few were noted. Winnesheik and Allamakee counties.

(87)—*Setophaga ruticilla*. RED START.

Breeds abundantly in both counties. Nests were found some 30 feet from the ground. Winnesheik and Allamakee counties.

(88)—*Galeoscoptes carolinensis*. CAT BIRD.

Breeds very abundantly throughout the valley. Winnesheik and Allamakee counties.

(89)—*Harporhynchus rufus*. BROWN THRASHER.

A common breeder in both Winnesheik and Allamakee counties.

(90)—*Troglodytes aedon*. HOUSE WREN.

Quite abundant at Decorah, also noted many times on our trip down stream.

(91)—*Cistothorus palustris*. LONG-BILLED MARSH WREN.

Quite common in the marshes about New Albin, also noted in several places along the river. Winnesheik and Allamakee counties.

(92)—*Sitta carolinensis*. NUTHATCH.

This busy bird of the forest was found quite abundant in both Winnesheik and Allamakee counties.

(93)—*Parus atricapillus*. CHICADEE.

Very abundant throughout the range. Winnesheik and Allamakee Co's.

(94)—*Turdus mustelinus*. WOOD THRUSH.

Common in both Winnesheik and Allamakee counties. Young and adults were obtained in both places.

(95)—*Turdus fuscescens*. WILSON'S THRUSH.

Breeds along Canoe river near the junction with the Oneota, where young and adults were obtained. Also noted at other places. Winnesheik and Allamakee counties.

(96)—*Merula migratoria*. ROBIN.

Common throughout the valley but partial to the cultivated portions. Winnesheik and Allamakee counties.

(97)—*Sialia sialia*. BLUE BIRD.

Blue Birds were exceedingly scarce owing to the cold winters of 1894-'95 which threatened to exterminate the race. Only one pair was noted about two and one-half miles south of Decorah, where they had established themselves in a tree and were left unmolested with our best wishes for a successful year at house keeping. Winnesheik county.

(98)—*Passer domesticus*. ENGLISH SPARROW.

Though the last in our list he was by no means the least abundant. He seems to have spread pretty well over the entire area of the Oneota valley, as most farms were provided with a band of these birds. Only the smaller out of the way houses seemed to have been neglected, but judging from the small flocks which were occasionally noted—evidently exploring expeditions—it will not take long until even these will have received their quota of these birds.

DISCUSSIONS.

MR. BROWN thinks it is not always safe to judge the abundance of the Wild Turkey by the tail feathers found in the woods. Nor does it unmistakably indicate the presence of this species to find Turkey feathers, even in remote regions, as many such feathers never had more than a tame Turkey attached to them.

Mr. Law inquires if the other members have found the Louisiana Water-Thrush to be the prevailing form in their localities. In Dallas county, he thought the Water-thrush (*Seiurus moticilla*) to be the most abundant, the other species only a rare visitor. There seems to be some diversity of opinion as to which is the most plentiful in the state, both species having been noted as nesting. These were included in the list of birds of which the Association should make special study the ensuing year.

The fact of the Sharp-shinned Hawk nesting in such abundance in the two counties—Winneshiek and Allamakee—is surprising and brings forth a number of remarks. Mr. Brown suggests that if more thorough search were made it would probably be found nesting in other portions of the state. Mr. Savage can only see one explanation of their scarcity in Henry county, and that is the abundance of the Cooper's Hawk. Mr. Bartsch has the abundance of the Sharp-shinned succeeded by a scarcity of Cooper's, and "'tis a poor rule that won't work both ways."

DEATH OF MRS. WALTERS.

THE Angel of Death has entered our midst and taken one of our number. It is with sadness that we announce the death of Mrs. Gus Walters, an active member of the Iowa Ornithological Association. She died at her home at Cedar Falls, Iowa, on July 31st, 1897. Mrs. Walters was an ardent lover of birds and her skillful fingers often helped her husband while at his taxidermical work.

We believe she looked "Though Nature up to Nature's God." She regarded this beautiful world as one of the numberless chambers in a Heavenly Father's mansion, from which death was but a door opening into larger and brighter rooms beyond. She has but gone on before.

RESOLUTIONS.

In view of the loss we have sustained by the decease of our friend and associate, Mrs. Gus Walters, and the still heavier loss sustained by those who

were nearest and dearest to her.

THEREFORE—be it resolved that it is but a just tribute to the memory of the departed to say that in regretting her removal from our midst, we but speak the sentiments of her friends and the Iowa Ornithological Association.

RESOLVED—that we sincerely condole with the family of the deceased and commend them for consolation to Him who orders all things for the best.

RESOLVED—that this testimonial of our sympathy be forwarded to the friends of the departed through the columns of the IOWA ORNITHOLOGIST.

J. EUGENE LAW,
MRS. M. A. TRIEM,
MRS. M. L. RAUN.

NOTES AND NEWS.

Mr. Hiram Heaton of Glendale, Ia., made a pleasant call at the editorial den recently. The editor is always glad to entertain any of the ornithological brethren.

On September 3rd, 1897, Mr. J. H. Brown, J. Eugene Law, Chas. R. Keyes and David L. Savage took supper at the hospitable home of George H. Burge, of Mt. Vernon, Iowa. There is no need to say the hour was one of pleasure and profit. Mr. Burge has quite an extensive collection of bird's eggs and mounted birds.

We are sorry to learn that the Nidologist, of Alameda, Cal., has been discontinued. The May issue is the last published. The main features, however, will be regularly continued by the same writers as a department of the Popular Science News.

Mr. Ernest Irons of Council Bluffs writes that the Least Bittern is a common breeder in Pottawattamie county, building its platform of sticks and straws in the cat-tails and rushes along the margin of swampy lakes. The nests are generally placed a few inches above the water, although I have found some nests with eggs on dry ground near the margin of a lake. The eggs vary in number from three to seven. The usual number is four or five. When first hatched, the young are golden yellow and are covered with soft fluffy down, being, to my mind, prettier during the first three or four days of their existence than they ever are afterward, with the exception possibly of the rich coloring of the adult male.



New books and other publications will be reviewed in this department. Authors wishing publications reviewed should send them to the Editor, who will examine them personally and give them due consideration.

"Citizen Bird"—Scenes from bird life in plain english for beginners, by Mable Osgood Wright and Elliott Coues, with one hundred and fifteen illustration by Louis Agassiz Fuertes. New York, The Macuillian company, 1897. Cloth, \$1.50. "Citizen Bird" will do more toward protecting our feathered friends than any work that has yet appeared. It has no equal. Every home should contain a copy.

Grinnell's "Report on the Birds of the Islands of Santa Barbara, San Nicolas and San Clements." A twenty-six page phamphlet, which is a report of the birds recorded during about a month's exploration among the islands last spring (1897). The sixty species treated, are arranged in four seperate lists—the land birds observed in each of the islands and the water birds recorded during the entire trip. It is replete with interesting field notes.

PUBLICATIONS RECEIVED.

Birds, Vol. 2, No. 3, September, 1897.

Fern Bulletin, Vol. 5, No. 3, July, 1897.

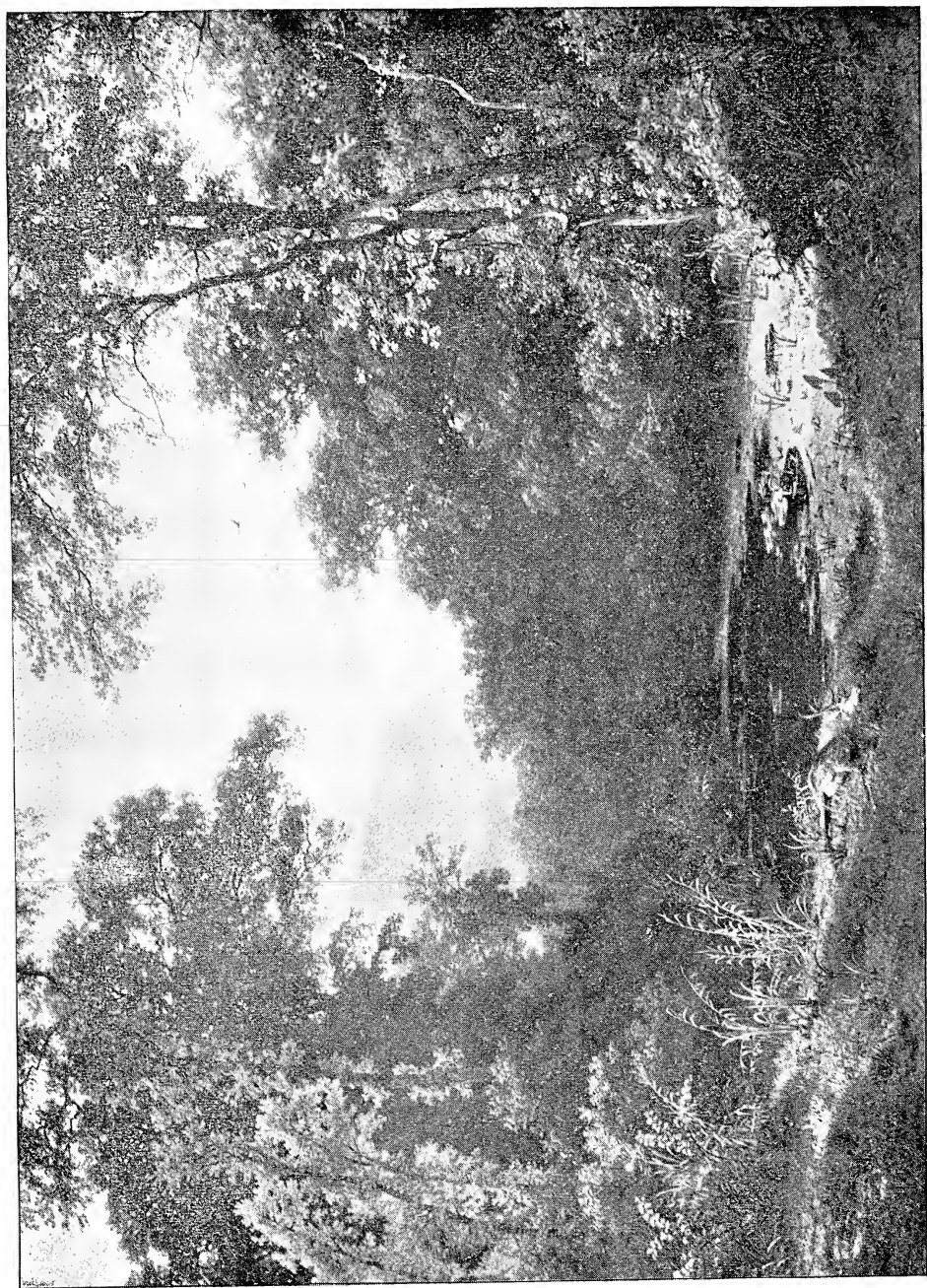
Le Naturaliste Canadien, Vol. 24, Nos. 8-10, Aug.-Oct., 1897.

Museum, Vol. 3, No. 10-12, Aug.-Oct., 1297.

Oologist, Vol. 14, Nos. 7-10, July-Oct., 1897.

Osprey, Vol. 1, No. 12, Vol. 2, No. 1, Aug.-Sept., 1897.

Popular Science News, Vol. 31, Nos. 8-10, Aug.-Oct., 1897.




"Mid Haunts of Coot and Tern."

The Psychic Nature of Bird Song.

BY MORTON E. PECK.

Paper read before the Third Congress of the I. O. A.

F all the errors regarding the habits and natures of birds, none is more prevalent than the total misconception of the real character of their songs and the articulate sounds which they produce. The mistake is easily accounted for. A degree of similarity existing between their notes and the human voice and some musical instrument, when producing sounds expressive of certain mental states, has lead men in all times, following an aesthetic rather than scientific impulse, to fancy them indicative of the same feelings as those which inspire spontaneous human song. A glance at the position occupied by birds in the vertebrate series and the examination of a few facts regarding their vocal expression will be sufficient to show how improbable it is that these are the outcome of any very complex psychic phenomena.

The natural position of birds is between the Reptilia and Mammalia. In the circulatory and respiratory system, including bodily temperature, they are much nearer the mammals; but on the other hand their organs of reproduction closely resemble those of the reptiles, and what is still more important in the present instance they have the lissencephalous reptilian brain. It is clear therefore that their mental faculties must be far below those of the quadrupeds, and will not pass far beyond the line of protective and reproductive instincts.

The songs and cries of birds are very generally supposed to indicate grief, joy, love, hate, anger, triumph, regret, and many other feelings of a more or less complex character. It is during the mating season that their vocal powers are exercised to their fullest, and hence the songs, notably of passrine birds, are supposed to express sentiments of joy and affection. Several facts may be cited which will show the improbability of such a theory. In the first place why should not the song continue till after the young are hatched, at which period paternal pride and affection would naturally be the strongest, instead of gradually ceasing as incubation advances? Again, if a nest is broken up and replaced by another, there is another reason of song, though no new mating, nor have we reason to think there is any special revival of joy or affection. And further, many song birds, some of which utter a great variety of cries will sing under the stress of any very strong excitement. I have observed a Batbird that had accidentally made its way into a room full of people singing with the accompaniment of a piano, after vainly seeking a way of escape, break into song, and continue singing for some time in a perfectly normal tone

and key. Many of the Vireos, conspicuously the White-eyed, "sing" their regular song as an alarm-cry when the nest is approached. Of course all those birds that have but a single cry may utter this on occasion of excitement of any kind. It does not seem likely therefore that the songs of birds during the mating season indicate any such purely psychical phenomenon as affection or joy, that is, of a rational or mental character. In fact, the excitement that calls forth the song at this time is in a large measure physical. During the mating period the bird is physically more active than at any other season of the year. This activity is manifested in various ways—by superior energy of movement, great pugnacity, perfection of coloration, and chiefly by sexual excitement; on their last in fact, the other manifestations of activity are more or less dependent, and it is to this also that the song is due. The reproductive instincts are now predominant and their natural expression is largely through the vocal organs. No doubt the song of the male bird is attractive to the female in proportion to its perfection; not however from any aesthetic sense on her part, but only as it indicates physical vigor. It is one of the finer properties of her reproductive instinct to choose the most vigorous male as the parent of her offspring.

Furthermore, this theory, that the song in the mating season is merely the expression of sexual activity readily accounts for the fact that a second period of song precedes the deposition of a second set of eggs, whether the species normally rears two broods in a season, or the first set of eggs is destroyed and is replaced by a second. In either case sexual excitement is renewed, though, as we would naturally expect, to a less degree than at first, and the song is proportionately feebler and its period of continuation shorter.

It is well known that many species of birds will remain inactive for a longer or shorter period after a nest has been broken up, uttering peculiar and often plaintive cries, which are usually supposed to be expressions of grief or regret over the loss. It is noticable however that these cries are usually the same as those emitted when an individual has become bewildered or lost during the migrating season, or is accidentally separated from the flock if the species is gregarious. The cause in both cases is doubtless much the same, and, though psychic in its nature is of a low and simple psychic order. It is merely that an instinct has been interrupted in its operation, the bird is at a loss what course to follow, and a species of mental excitement ensues which must find some vocal expression and which continues till the normal order of things is resumed. In the one case it is the migratory or gregarious instinct that has been interrupted, in the other the reproductive.

The sharp cries uttered by small birds on perceiving an individual of some perdatory species do not indicate any such complex psychic phe-

nomenon as hatred ; they are either manifestations of fear, a much simpler form of mental activity, or are alarm-cries, uttered for the purpose of calling others to the rescue ; that is, they are dependent on a rudimentary reasoning faculty, which is but a slight advance on instinct and grows out of it. That a fixed animosity does not exist in birds is plainly shown by the fact that species hostile to small birds during the breeding season only, such as Crows and Jays, dwell with them in comparative peace during the rest of the year, however great the aversion manifested while the eggs and young are in the nest. Raptorial birds are of course always regarded as natural enemies, but, judging from the analogy of the former case, it seems probable that they are only held in fear which has grown instinctive.

From the facts above given, and from many others of a like nature that might easily be presented, it seems hardly reasonable to suppose that the songs of birds have any more psychical significance than many other phenomena which they manifest. As before indicated it is easy to imagine that the endless variety of notes which they produce might be, judged by a human standard, expressive of an indefinite number of moods of mind. It seems, however, to be a general law among vertebrates, excluding man, that the vocal powers are developed, not according to the position occupied in the whole series, but according to the mean degree of physical activity attained. Though there are exceptions to this, they are not sufficiently numerous to destroy its force as a law. Birds are by far the most active of all vertebrates. Metabolism and catabolism reach in them their climax, the bodily temperature is higher than in any other class ; the vital functions are performed with greater rapidity, and hence the vocal powers reach a higher stage of development. The same law holds within the class as in the whole vertebrate division. For example, the Vultures and Herons, which are comparatively sluggish, have very limited voice powers or none, while the Sparrow and Finch family, which are among the most active of birds, are unsurpassed in the gift of song.

The subject will doubtless admit of infinite research, and presents opportunities for many interesting discoveries. I have here presented, but in a very brief and general way what seems to me the most natural, and in fact the only reasonable theory regarding it.

The Psychic Nature of Bird Song.

BY MRS. MARY L. RANN.

Paper read before the Third Congress of the I. O. A.

IT is a question if Mr. Peck takes himself seriously in "The Psychic nature of bird song," or expects others to, as his closing paragraph contains the following: "The subject will doubtless admit of infinite" research and present opportunities for many interesting discoveries, I therefore beg leave to present a few thoughts on the other side. We must first admit that from the elusiveness of the subjects, that no standpoint, either scientific or not scientific, is likely to settle the varying opinions entertained. Mr. Peck feels his way carefully, though taking a scientific standpoint, admitting thereby that science has its limitations. It is quite probable that the unfortunate classification of birds may have swaged his mind, for who could endorse a bird with soul qualities under the reptilian stigma? We are told by Leonherd Stijneger that the classification of birds between the reptiles and the mammals, does not indicate any intermediate position in nature, but is simply due to our inability of expressing their exact position on a flat sheet of paper, but from this classified position they are far removed from the ancestral stock. Now common sense would say we had better give them the exact position due them as far and away removed from either reptiles and mammals. When we see birds bribe a snake by punching out its eyes and stand guard till it is dead, we are convinced there is an enmity between their ancestry and their present position in evidence for our instruction at least. We think of birds and their endowments as the most wonderful in animal life. The dullest clod is not insensible to their songs. It strikes the soul of the listener with psychic force, as coming from and to that invisible realm which is the actual and real within us. There is rhythmic humming akin to human song. Why does a bird not express joy, gladness and even ecstasy of soul emotions, as in man? Luckily for us who believe that it does, cold science cannot prove that it is no more than automatic overflow from some psychical excitement. We say a bird expresses joy when it sings because it sings, and it is my observation that few birds sing under an apparently excited condition. We might say as much perhaps of the Wren, but of ordinary birds we often see extreme deliberation. The meadow lark rises to a fence post, presses his feathers and when the spirit moves, sings. So with the Brown Thrush, and one's patience is sometimes tried before he begins, even in nesting time. The Lark Buntings feed and sing through the fields, while the Prairie Lark sings, like the Wren,

with a good deal of fuss on feathers without any well defined cause. I should say in the instance of the Catbird singing, in Mr. Peck's paper, that it sang from pure expression of enjoyment in the music. The similarity in the evidences of kindred endowments in birds and the human species gives us a human interpretation. We have covered a great field with the word instinct to account for that which is not easy to explain, and made it stand for something inferior to reason in the mind of the thinker. So we cover bird life with its architectural display of reasoning faculties, its knowledge of the points of the compass, its unerring migratory courses, its time of coming and going at certain dates, with even its knowledge of unvarying notes in a scale, as instinctive. We might say that, if they were blind and deaf. They show us in all these things that we read them with closed understandings, or not at all. When my birds arrive in the spring, a half dozen varieties reaching the grounds in the night, and I go out to find in some instances, all singing at the same time I may be mistaken but it seems like a song of thanksgiving whether it is really so or not. I must differ with Mr. Peck also in the length of time that birds sing. The air is full of bird song in the morning and on sunny days in March—many birds having arrived early in the month. Nesting time is a long way off, and if one is afield in August and September, the song sparrow announces himself as emphatically as in the early spring. Meadow larks sing after they have gathered in flocks for migration. and so with blue birds. In March the Juncos will fill a tree and all sing at a time, and Canadian tree sparrows can be heard on the sunny side of a mill any day in the winter, if it is not too cold. But the subject is interminable and will not admit of much argument in a short paper. It would appear as if the question of where the voice is situated in a bird's throat cannot be definitely settled by evidence. What chance has it through research in solving the problem of why a bird sings? It is self evident that we cannot interpret from any fixed standard, and the psychic point of view is as tenable as any other. There is no doubt that the different cries and sounds from birds, all have their meaning and express alarm, fear, pain and even hate. Birds may dwell together in peace, but they congregate with their own species, and do not take to mixed communities. They are necessarily mixed in nesting time, when a truce appears to be held for business purposes.

* The Third Annual Congress of the Iowa Ornithological Association.

MANCHESTER, IOWA, SEPT. 1, 2, 3, 1897.

FIRST SESSION.

The first session of the Iowa Ornithological Association was called to order on the afternoon of the first day of September with Pres. J. H. Brown in the chair.

Thursday evening, Sept. 2, was decided upon as the meeting to which the public should be especially invited. Four papers of a not too technical nature were selected for the occasion. Two papers, "One Small Piece of Ground" by Mr. Burtis H. Wilson, of Rock Island, and "The Summer Birds of the Oneota Valley" by Mr. Paul Bartsch, of Washington, D. C., were read, both calling forth a long and interesting discussion by all present.

SECOND SESSION.

For the second session it was decided to drive out to the Fisheries, a few miles out of Manchester, and there listen to the reading of papers. One paper, "The Psychic Nature of Bird Song," by Mr. M. E. Peck, was read. A very warm discussion, led by Mrs. Mary Rann, ensued. The paper presented a very fruitful field for thought.

THIRD SESSION.

"What Can the Members do to aid the Association?"

- - - - - H. J. Giddings, Sabula, Iowa.

"Notes on the Inter-breeding of the Red-shafted and the Yellow-shafted Flickers."

- - - - - E. E. Irons, Council Bluffs.

"Summer Haunts of the Swamp Sparrows,"

J. Eugene Law, Perry.

"Summer Birds"

- - - - - Hiram Heaton, Glendale.

"A Talk on the Manchester Agassiz Association"

Mrs. M. A. Triem.

Several new arrivals at the Convention also added a new interest to the discussions.

FOURTH SESSION.

At the opening session the following papers were presented:

"Through Naturalist's Eyes," - - - - - D. L. Savage

"Bird Notes," - - - - - W. W. Loomis

"On the Probable Occurrence of Fossil Birds in Iowa," Wilmon Newell

"The Practical Side of the Ornithologist's Work," J. H. Brown

*Through the carelessness of our former printer these minutes were omitted from the October, 1897 Iowa Ornithologist, when they should have been published.

Considerable interest was shown by the visitors present and a pleasant as well as profitable evening was spent by all.

FIFTH SESSION.

For the place of holding the fifth session, Mossy Glen, a most delightful as well as magnificent spot, was chosen. It is situated about fifteen miles directly north of Manchester, in Clayton county. This gully, one of the feeders of the Volga river, for it abounds in springs, opens to the north, and on either side at a distance of fifty yards or less apart perpendicular walls of rock rise to the height of from fifty to seventy-five feet, while at the upper end of the glen the washing out of the springs has produced a huge overhanging wall which protects a large amphitheater, not only from the noon day sun but from any direct rays whatever.

In this spot, on one of the hottest days of the summer, the members of the I. O. Association, scattered about and perched on Nature's stools in cool comfort, and with a projecting ledge for the President's chair, held a business meeting so intensely interesting that it was only aroused to a knowledge of the outer world late in the afternoon by a large Turkey Vulture, which after peering about several nooks and out-hanging rocks, finally settled on a large stub, which protruded from the rocks, directly over the heads of the members.*

BUSINESS MEETING.

The members present spent considerable time discussing the birds comprised in the annotated list now in the course of preparation. It was determined that an appeal be made to all members for a thorough study, with an eye to the differentiation of the eastern and the western varieties and the relative and actual abundance of the following: Red-tail, Great-horned Owl, Night Hawk, Meadow Lark, Grasshopper Sparrow, Lark Sparrow, Loggerhead Shrike, Maryland Yellowthroat, Robin, Blue Bird; a special study of the varieties occurring within the state of: Grebes, Loons, Gulls, Terns, Sandpipers, Arctic Woodpeckers, Horned Lark, Whippoorwill, Longspurs, Redpolls, Juncos, Vireos, Waterthrushes, Chickadees, Wrens, Thrushes; the possible occurrence of Prairie Sharp-tailed Grouse, Yellow-crowned Night Heron, Burrowing Owl, Summer Tanager, Barn Owl; the possible nesting of Franklin's Gull, Solitary Sandpiper; relative abundance of Traill's Flycatcher, and Little and Acadian Flycatchers, Least and Baird's Sandpipers, King Rail and Florida Gallinule, Sora and Virginia Rails; notes on the occurrence of Harris's Sparrow, Savana Sparrow and White-crowned Sparrow.

*Several large views of the glen with members of the association scattered about on the rocks were taken, and the pictures (5 x 7) may be procured for fifty cents each by applying to Mr. Wilmon Newell, Ames, Iowa. The proceeds to go to the treasury of the I. O. A.

The report of the Treasurer was then read and accepted.

It was resolved, "That an assessment of one dollar each on all the members be made to settle the debt of the Association." The Association has been holding its own for the past year and when the back debt is lifted it will be self supporting,

It was resolved, "That the printing of the official organ be let to Mr. C. C. Tyron, of Avoca at nine dollars an issue."

A committee, consisting of Mrs. Rann, Mrs. Triem and Mr. Newell, was appointed to decide on a more suitable color for the cover of the official organ.

It was resolved, "That the Committee on Annotation sub-divide the A. O. U. list among themselves, each taking a portion and devoting himself to the families included in that portion."

It was resolved, "That department heads be elected to do special work in the following branches: Migration and General Distribution; Economic Importance and Food Habits; Nidification; Seasonal Variation in Food, Plumage, and Habits."

SIXTH SESSION.

Adjourned Business Meeting, Sept. 4, 6:00 a. m.

There was a long discussion as to admitting members from outside the state to active membership.

It was resolved, "That Art. II. be removed from the Constitution and be made part of the By-Laws."

It was resolved, "That Section I. of this clause be amended so that the word "three" shall be struck out and "four" inserted in its place, and the words "and Corresponding Members" be added."

It was resolved, "That the By-Laws be temporarily waived and Mr. Lynds Jones of Oberlin, Ohio, and Mr. Burtis H. Wilson, of Rock Island, Ill. be admitted to Active Membership."

The Congress then proceeded to the election of officers. They were elected as follows:

OFFICERS:—President—J. H. Brown, Maqoketa, Iowa.

Vice-President—Mrs. M. A. Triem, Manchester, Iowa.

Secretary—J. Eugene Law, Perry, Iowa.

Editor-Treasurer—D. L. Savage, Salem, Iowa.

EXECUTIVE COUNCIL:—Wilmon Newell, Ames, Iowa, Chairman.

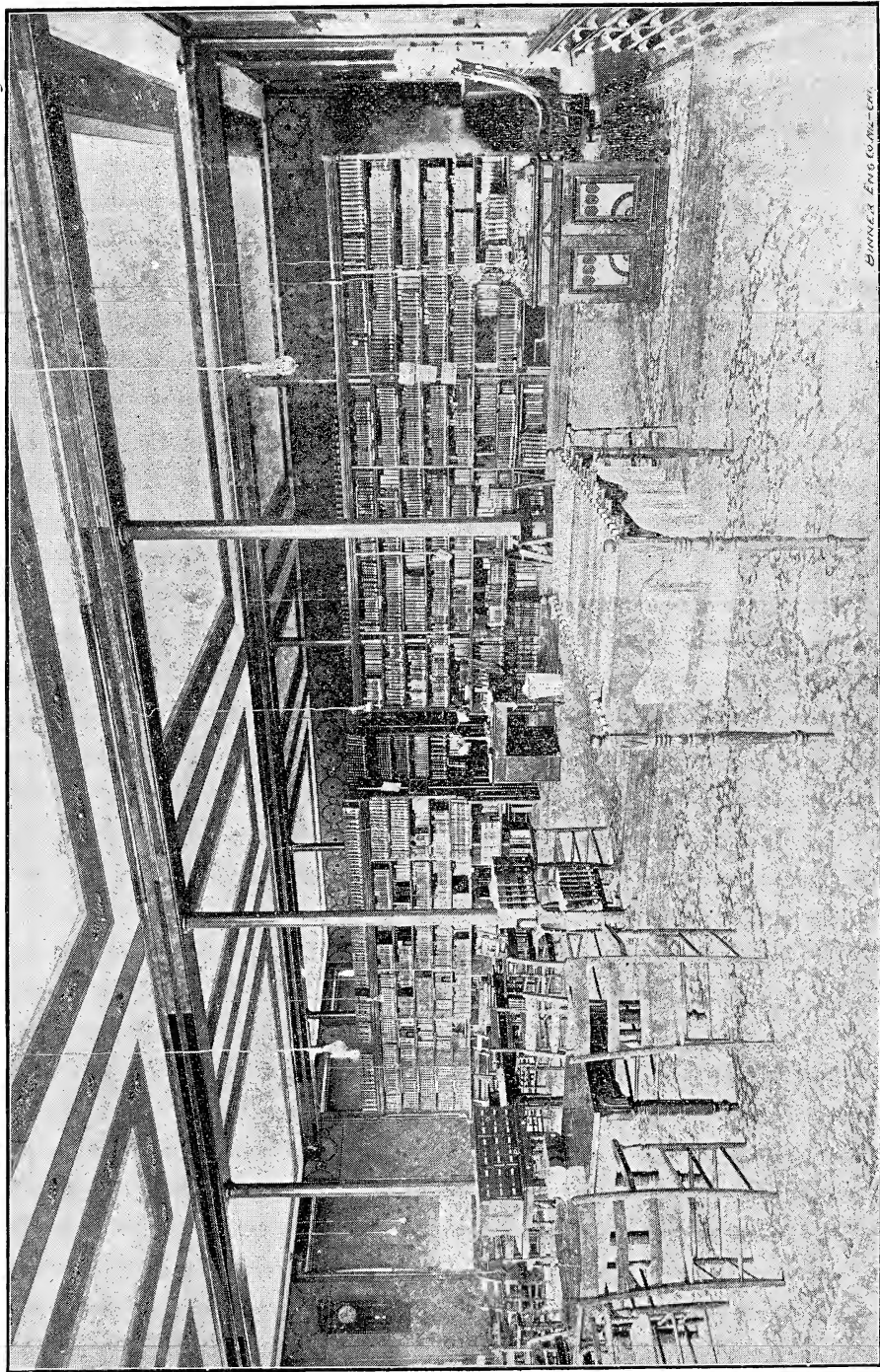
Carleton R. Ball, Ames, Iowa.

W. W. Loomis, Clermont, Iowa.

FINANCE COMMITTEE:—Carl Fritz Henning, Boone, Iowa, Chairman.

Geo. H. Burge, Mt. Vernon, Iowa.

H. J. Giddings, Sabula, Iowa.



WINNIE'S PHOTOGRAPH

College Library, Iowa State College, Ames, Iowa

DEPARTMENT HEADS :—Migration—Carl Fritz Henning, Boone, Iowa.

Nidification—J. H. Brown, Davenport, Iowa.

Economic Study—Wilmon Newell, Ames, Iowa.

Seasonal Variation—Paul Bartsch, Washington, D. C.

It was resolved, "That the Secretary, as Chairman, with two others, draw up resolutions on the death of Mrs. Gus Walters, to be printed in the I. O., and in the minutes of this meeting, and a copy of the resolution be sent to the local paper at her home and to the relatives of Mrs. Walters."

It was resolved, "That the Agassiz Association and others of Manchester who have helped to make the Congress a success be tendered a vote of thanks for their kind entertainment and hearty co-operation."

It was resolved, "That Ames be the next place of annual meeting and that it be held during the third week of August, 1898."

It was resolved, "That a Chairman of a Program Committee be selected and he be given power to choose his assistants. This Committee to see in ample time that an extensive program be selected for the next Congress."

Mr. D. L. Savage was selected as the Chairman of this Committee."

It was resolved, "That Art. III. Sec. 1. of the Constitution be so amended as to include an Advertising Manager as one of the officers of the Association." It was also resolved, "That Art. IV. Sec. 6 be made to read: The duties of the Advertising Manager shall be to promote the Commercial Interests of the Official Organ."

The Secretary was instructed to cast the unanimous vote of the Association for Mr. C. C. Tryon of Avoca for this office.

The Association held a long discussion on the methods of bringing our work before the people.

It was resolved, "That two Committees be appointed, one to get up a popular lecture suitable for presentation to High Schools, the other to get up one suitable for presentation before the meetings of the Farmer's Alliance." The plan, though not quite ripe as yet, is to have these lectures on hand in presentable shape and hold them ready to send to any of the members who see a chance for presenting them.

For the first above named committee Mrs. M. A. Triem and Mr. J. H. Brown, were selected. For the second, Mr. D. L. Savage, Mr. Geo. H. Burge, and Mr. Hiram Heaton.

The congress then adjourned to meet the third week in August, 1898, at Ames, Iowa.

J. EUGENE LAW, Secretary.

Economic Study.

In compiling the work on Iowa Birds, a study of the economic phase of Ornithology and especially of Iowa Ornithology, is essential. With this end in view therefore every active member is solicited to preserve the stomach, with contents, of every bird collected by him, regardless of season or species. The stomachs should be preserved in ordinary or wood alcohol, 90 per cent solution, or in a 2 per cent solution of formic aldehyde. The alcohol is to be preferred.

Each stomach should have attached to it a label written in *India ink* or *lead pencil*. This label should correspond to numbered data recording the locality, date, name of bird, sex, character of place collected, and time of day, together with any remarks that may prove of use. Identification whenever doubtful should be made certain by saving the skin and numbering it to correspond to the stomach. The skin can then be sent in with the stomachs and after identification will be returned to the owner.

The Association will co-operate with the Biological Survey, U. S. Dept. of Agr. in this work. It is hoped that *every* member of the I. O. will take an active part in this work, and do as much as possible, adding thereby both to the reputation of our Association and to the value of its subsequent publications.

Those who are prepared to enter into active work from now on, and those wishing further information are requested to correspond *immediately* with the Chief of Economic Dept., Wilmon Newell, Agricultural College, Ames, Iowa.

A Call to Duty.

At the Third Congress of the Iowa Ornithological Association held at Manchester, Iowa, Sept. 4, 1897, our Association decided to appoint department heads to take up special work and aid the Annotation Committee—these heads to take up four branches, as follows: Economic Study, Nidification, Seasonable Changes, and Migration, of the last of which I had the honor of being chosen Chief.

J. Eugene Law, Secretary of our Association writes, that regarding migration, the plan is to make a special study of the routes chosen by the birds through Iowa—also a study of Bird Waves.

□ In the winter of 1881-2 Prof. W. W. Cooke, attempted to secure the assistance of the ornithologists of Iowa in studying the migration of birds—changing his residence from Iowa to Minn., necessitated a modification of

the original scheme, and it was decided to increase the size of the original area to include the whole Mississippi Valley.

In 1888 the U. S. Dept. of Agr., Division of Economic Ornithology, published Bulletin No. 2, W. W. Cooke's "Report on Bird Migration in the Mississippi Valley for the years 1884-5."

Since then no attempt has been made to my knowledge to gather material for a report on bird migration in Iowa.

Our Association has taken up the work and as Chief of this interesting branch of the study, I earnestly ask the hearty co-operation of *every member* of the I. O. A. Without your aid, there can be no success.

Let us go to work in earnest—let us put down our daily records full and complete, and then when our notes are published in connection with the "Birds of Iowa," each individual member of the Association will have reason to feel proud of the work so cheerfully done. Get ready for the spring migration—due credit will be given in the forthcoming report to every one contributing to its success. Yours in the work,

CARL FRITZ HENNING,

Chief Migration Department.

Boone, Iowa.

Bird Migration in Iowa, Instructions to Collaborators.

The department particularly desires from each observer a brief but careful description of the principle physical features, including latitude, longitude and altitude of the locality which is the seat of observations.

The data collected may be arranged conveniently in three general classes: *a.* Ornithological Phenomena; *b.* Meteorological Phenomena; *c.* Contemporary and Correlative Phenomena.

a. ORNITHOLOGICAL PHENOMENA.

Each observer is requested to prepare, at his earliest convenience, a complete list of the birds known to occur in the vicinity of his station, and to indicate (by the abbreviations inclosed in parentheses) to which of the following five categories each species pertains:

1. *Permanent Residents*, or those that are found regularly throughout the year. (R.)
2. *Winter Visitants*, or those that occur only during the winter season, passing north in the spring (WV).
3. *Transient Visitants*, or those that occur only during the migrations, in spring and fall (TV).
4. *Summer Residents*, or those that are known to breed, but which depart southward before winter (SR).

5. *Accidental Visitants*, or stragglers from remote districts (AV).

It is desirable also to indicate the relative abundance of the different species, the terms to be employed for this purpose being: *Abundant*, *Common*, *Tolerably Common*, *Rare*.

If you are in a position to observe the lines of flight of birds, have you noticed whether or not such lines are influenced by the topography of the country, and if so, to what extent?

If a mountain intercepts the line of flight, what kinds of birds pass around it, and what kinds pass over it?

What localities in your neighborhood are sought as resting-places by the various kinds of migrating birds? Can you give any reason for this selection?

What kinds of birds generally move in flocks, and what kinds in pairs or singly?

Are you familiar with any kinds of birds in which the males and females, and old and young, fly in separate flocks? In many species the males arrive in advance of the females, hence it is important to note the sex of the first comers, and the date at which the opposite sex is first seen.

Have you observed from year to year any increase or decrease in the numbers of any kind of bird known to you? If so, do you attribute such change to altered conditions in the bird's breeding grounds? If not, can you assign a cause?

Have you observed the increase or decrease of one species to affect the numbers of another species. If so, can you explain the fact?

Has any kind disappeared altogether, and if so, can you assign a cause for this disappearance?

Among the birds which are now common about your station is there any kind that was formerly rare or absent? If so, can you explain the fact?

Among the birds which breed regularly in your vicinity have you ever observed an individual which by some personal peculiarity (such as the presence of white or dark feathers where they do not belong, or by some deformity) could readily be distinguished from others of its kind? If so, has this bird returned to the same place to nest year after year?

In recording arrivals and departures it is highly important to distinguish the movements of irregular stragglers, of the advance guard or "van," and of the principal mass or "bulk" of the species. For this purpose observers are requested to note:

1. When the species is first seen.
2. When it is next seen.

3. When it becomes common.
4. When the bulk departs.
5. When the last individual is seen.

In addition to the above data, which *all* observers are requested to furnish, the Department particularly desires exact records of every increase and decrease in the numbers of a given species over a given area; for it is only by the knowledge of the daily fluctuations of the same species in the same place that the progress and movements of a "flight," or "bird-wave," can be traced. Such data can be contributed by experienced observers only, and in their procurement much time must be spent in the field. During the progress of the migratory movement the observer should go over the same ground day after day, and, if possible, both early in the morning and late in the afternoon. He should visit woodlands, thickets of dense undergrowth, and open fields; and if possible, both swamp and upland should fall under his daily scrutiny.

The above may be regarded as *essential data*. There are many other noteworthy details that bear more or less directly upon the complicated problems involved in the study of migration. Among such may be mentioned the bodily condition of the bird (whether fat or lean), the moult, and the periods of song. The time of mating, when observed, should always be recorded.

(b) *Meteorological Phenomena.*

Information is desired upon :

1. The direction and force of the wind.
2. The direction, character, and duration of storms.
3. The general conditions of the atmosphere, including rainfall.
4. The succession of marked warm and cold waves, including a record of all sudden changes of temperature.

(c) *Contemporary and Correlative Phenomena.*

The Department desires that the data under this head be as full and complete as possible, and requests exact information upon :

1. The date at which the first toad is seen.
2. The date at which the first frog is heard.
3. The date at which the first tree-toad or "peeper" is heard.
4. The dates at which certain mammals and reptiles enter upon and emerge from the state of hibernation.
5. The dates at which various insects are first seen.
6. The dates of the flowering of various plants.
7. The dates of the leafing and the falling of the leaves of various trees and shrubs.
8. The dates of the breaking up and disappearance of ice in rivers and lakes in spring, and of the freezing over of the same in the fall.

CARL FRITZ HENNING,
922 Eighth St. Boone, Iowa.

Chief of Migration Dep't.

Notes and News.

Owing to the illness of the editor, Mr. Savage, the publication of the January issue has been delayed. The publication of that issue has been placed in the hands of the undersigned and matters have been pushed with the greatest possible speed. Mr. Savage cannot in any way be blamed for the delay—on the contrary he deserves the sincere thanks of the Association for the earnest efforts he has made, and for the amount he has accomplished, working as he has been, under so many difficulties.

Thanks are also due to Hodson Bros, printers, for their alacrity and neatness in printing the present issue. We are also under obligations to Prof. C. R. Ball, of Ames, for much valuable assistance.

We can assure our subscribers and fellow members that arrangements will soon be completed whereby future issues will appear on time.

CARL FRITZ HENNING,

Chairman Finance Com.

WILMON NEWELL,

Chairman Ex. Council.

Boone, Iowa, Feb. 26, 1898.

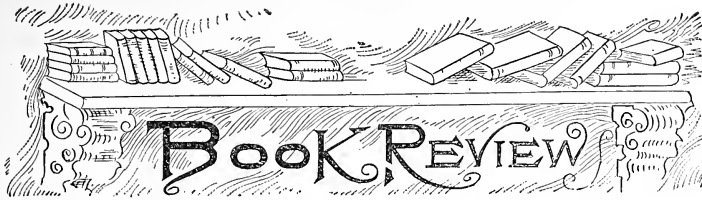
One of the most attractive exhibits in the Louisiana section of the History Building at the Tennessee Centennial Exposition was the original painting of the wild turkey, by Audubon and Bachman. The bird was killed on a Louisiana plantation and taken to the home of Col. Percy Smith, where it was painted by Bachman. At the time of the purchase of the painting the Smithsonian Institute offered \$4000 for it. The colors are still as fresh and bright as when first painted.

Chief Henning of the Migration Department, writes the editor that if necessary he will ask active members Coleman and Andrews of his city to assist him in compiling the spring migration reports if they come in too fast, and if worse comes to worse, he will call on brother Newell of the Agricultural College at Ames. to help him out. Let us flood him with notes on the spring movements of our beloved birds and make him keep his word.

Since our last issue the following persons have been admitted to active membership: Miss Charlotte M. King, Ames; Messrs. B. B. Hill, Ames; Fred O. Schmidt, Boone. Let the good work go on.

The Ornithological Museum of the Agricultural College at Ames, has recently undergone a complete rearrangement, now making this extensive collection readily accessible to both general and scientific students as well as to the general public. It is well worth a visit.

Do not forget to have in mind a suitable subject for an exhaustive paper to be read at the next annual meeting of our Association, at Ames in August. Though early yet, we should make ample and thorough preparation. This will probably be the greatest and most successful of any meeting thus far held in the history of the Association.



New Books and other publications will be reviewed in this department. Authors wishing publications reviewed should send them to the Editor who will examine them personally and give them due consideration.

"Bird Life," a guide to the study of our common birds, by Frank M. Chapman, with seventy-five full page plates and numerous text drawings, by Ernest Seton Thompson. New York, D. Appleton & Co. 1897.

"Bird Life" is indeed a guide to the study of our common birds, for any one who is fortunate enough to be the owner of this valuable work, by Mr. Frank M. Chapman. The opening chapters are:

I The Bird, Its place in Nature and Relation to Man. II The Living Bird. III Colors of Birds. IV The Migration of Birds. V The Voice of Birds. VI The Nesting Season. VII How to Identify Birds, and a field key to our common land birds. About two-thirds of the volume is taken up with ably written biographies of "our common birds." The 75 full page plates of birds and the numerous drawings are by our well known ornithologist and artist Ernest Seton Thompson. Mr. Chapman and the publishers are to be congratulated on securing the services of this most excellent artist of our feathered friends. "C. F. H."

Gleanings from Nature. No. 1. "Some Oological Abnormalities," by J. Warren Jacobs, will be out in a few weeks—not later than Feb. 15th. Among the descriptions of freak sets will be found two sets from Jasper County, Iowa, namely, Prairie Horned Lark and Yellow Warbler.

"D. L. S."

"How to know the Ducks, Geese and Swans of North America," by Chas. B. Cory. Boston. Little, Brown & Co. 1897.

How to know the ducks, geese and swans need not puzzle any one who has a copy of this most excellent work by Charles B. Cory, all the species being grouped according to size and color. The work is intended to meet the wants of a large number of persons who are interested in birds and would like to know their names but often find it no easy task to identify them by the "bird books." It is of especial value to the sportsman. The

"How to know the Shore Birds (*Limicolae*) of North America," by Charles B. Cory. Boston. Little, Brown & Co. 1897.

Chas. B. Cory's new work. "How to know the Shore Birds" is as valuable for the working ornithologist as it is for the sportsman and should find a place in the library beside its companion book, "How to know the Ducks, Geese, and Swans," by the same author. Mr. Cory gives a good

description of the *Limicolae* of North America (south of Greenland and Alaska) and groups all the species according to size and color. The illustrations are by Mr. Edward Knobel. "C. F. H."

"Chapters on the Natural History of the United States" by R. W. Shufeldt M. D., Captain, Medical Department, U. S. Army (Retired). Associate in Zoology, Smithsonian Institution. Studer Brothers, publishers. 156 Fifth Ave. New York. Issued under the auspices of the Natural Science Association of America. New York, U. S. A. 1897. Large octavo. Extra cloth, Gold Top, cut or uncut edges. \$3.50 net.

"Chapters on the Natural History of the United States" is publication No. 2 issued under the auspices of the Natural Science Association of America, under whose auspices was issued as publication No. 1 that great work known Studer's Popular Ornithology "The Birds of North America," a superb imperial quarto volume of 110 artistic engraved colored plates, 12 by 15 inches, representing all our birds true to nature, with a copious text embracing the observations made by the most eminent writers on ornithology. Dr. Shufeldt's valuable new book (publication No. 2) is a handsomely printed large octavo volume of 400 pages. It is illustrated by many full page plates and numerous text figures. The life histories are written in a thoroughly popular style and will prove to be instructive to every student of nature. One of the chief features of the work consists of the elegant half-tone plates, reproduced from a series of photographs all made by Dr. Shufeldt himself from the living forms. The work is one of the best that has appeared of late years and should be in the library of every working ornithologist in the United States. "C. F. H."

"Bird Neighbors," that most excellent work by Neltje Blanchan, with an introduction by our favorite "John Burroughs," is having a remarkable sale, the first edition of 5000 copies being exhausted soon after publication. (published by Doubleday and & McClure Co.) A full review will be given in our next issue. "C. F. H."

Ord's Zoology, a reprint from Mr. Ord's private and only known copy of the Second American edition of Guthrie's Geography (edited by Samuel N. Rhoades), came too late for review in this issue of the Iowa Ornithologist. Ord's Zoology is indispensable to the working zoologist. A review will be given in our next issue. "C. F. H."

Nests and Eggs of North American Birds (Fifth Edition) by Oliver Davis is announced by the publishers as ready for delivery March 1st. This is the fifth edition of this popular work and will undoubtedly have an immense sale. Our friend Davis is to be congratulated. "C. F. H."

The following books are announced by the publishers:

"The Birds of North America" by Jacob H. Studer. Illustrated in colors. Studer Brothers. New York. \$40 to \$45, (Subscription price \$20 to \$22.50).

"Audubon and his Journals." By Maria R. Audubon. With Notes by Dr. Elliot Coues. Illustrated, 2 vols. 8vo. \$7.50.

"The Gallinaceous Game Birds of North America." By Daniel G. Elliott. Second edition, illustrated. pp 220. Francis B. Harper. \$2 50.



SCHALLER AUDUBON SOCIETY,
FOR THE PROTECTION OF BIRDS.

Founded June, 1897.

A Robin Pie.

BY IONE G. DANIELS.



In the days of pagan Rome, Horace and Ovid refer with approval to feasts of song birds, including roast thrush and "nightingales of monstrous price." Varo tells us that the epicure gratified his palate and his ear simultaneously, feasting upon the delicate warblers, while others, unconscious of their coming doom, were discoursing, meanwhile, the most exquisite music. The incident related in this story, occurring in our own midst, as it were, after a period of more than 2000 years, proves to us that with all our boasted civilization, remnants of savagery still exist.

Sitting by the open casement on a summer's morning, looking out upon a beautiful lawn, bordered with shade trees, in the town of Sheldon, Iowa, I overheard a coterie of boys—each armed with a small gun—discussing the merits of their murderous weapons, and the number of birds they had already shot since the opening of the season of bloom and song. I was at once interested, as I had been guarding a robin's nest, in a tree near by my chamber window and knew the predilection of the "small boy" for these song birds. As they drew nearer, I recognized two of the lads as sons of a prominent citizen, and was greatly shocked to hear one of them say, "I have killed fifty robins since our currants were ripe."

While pondering over this awful confession, and determined to lend my influence to stop this wickedness, the sequel to the morning's episode occurred. I was invited to a five o'clock tea, where eighteen Robin-red-breasts were served up in a pie! I refused my piece, saying, that I would as soon think of eating my grandmother!

Returned home full to the throat, sat down and dashed off the following:—

A Robin Pie.



It hath been said by many an one,
"There is nothing new under the sun."
But the phrase has lost its pith to me,
Since yester-night at a Sheldon "tea."

The feast was great, the guests were few,
The edibles choice—and one was new;
So new, it startled an untrained ear
The very name, of the dish, to hear.

Not since the famous nursery "fake"
Of the "four and twenty" blackbird bake,
In all the novelties 'neath the sky,
Had I ever heard of a ROBIN PIE!

'Twas a dish of song! The sweets of spring,
Smothered and baked in a pastry ring—
Just eighteen notes and thirty-six wings,
Missed from a world of beautiful things!

It may seem small to estimate these
On a planet swarming with birds and trees,
But, if in a flock of sparrows, one
In falling, shadows a sea of sun—
And nothing escapes the Father's eye,
In the blazing spaces of world and sky:—

Then am I glad I rev'rently hold
The russet crimson and Roman gold
Of the Robin's breast! Its life and mine,
In touch with Heaven and the life divine!

Sioux City, Iowa.

The Naturalists' Companion.

35 Cents per
Annum.

CHARLES P. GUELF,
EDITOR. J. AND J. PUBLISHER.

Single Copy,
5 Cents.

VOL. I.

BROCKPORT, N. Y., APRIL, 1836.

NO. 10.

Spring.

Spring approaches, hail collectors.
Hail from South, from East and West,
For the season now approaches
Which collectors love the best.
Bring the knapsack from its recess;
Fill it now with treasures rare.
Clamber ledges, follow gullies,
Walking while the day is fair.
Eggs of species rare and common,
Gather, blow, prepare and rest
In the dainty cotton spaces,
Resting in their tiny nest.
Mosses, ferns and ocean wonders,
Crystals bright of various metals,
Dainty flowers in varying colors,
Resting in their tiny petals.
These and more are precious treasures
To the true collector's mind:
Gathered in the realms of nature,
Ever present to remind.

Ernest Linwood.

The Money Cowrie.

(*CYPRÆA MONETA*.)

BY S. JACOB, NEWPORT, R. I.

The money cowrie of Guinea is very common on the Indian and Africa coasts; and is used in certain parts of Africa as a circulating medium; it is also employed for the same purpose in Hindoostan, particularly at Calcutta, where great quantities are obtained from the inhabitants of the Maldivé Islands, in exchange for rice. Many tons of these cowries are annually shipped from England to Guinea; these being originally brought

from the Maldivé Islands to Bengal, and from thence sent to England. The value of these shells as a circulating medium depends naturally enough on their greater or less abundance. In Bengal, in general, from 2,000 to 2,400 are equal in value to about fifty cents. But in Africa they are much deared, about 250 being valued at fifty cents. By dipping this shell for about thirty seconds in muriatic acid and then in cold water a most beautiful blue color will be found under the first or yellow coat, and on this account they are now being carved in Rome. The yellow coating being the head of the cameo and the blue for a background. By putting a letter or figure on the shell with wax before dipping in the acid, you will find when taken out whatever you have put on the shell in bold relief. The cowrie shells are found of three different forms, according to its age. There are some two hundred species of the cowrie shell, and is scientifically described as follows: Oval, convex very smooth, involuble; spine entirely posterior, very small often concealed by a calcareous layer deposited by the lobes of the mantle; aperture longitudinal, very narrow, slightly articulated, as long as the shell, and with the edges internally dentated and notched at each extremity. Inhabits the West Indian seas, Sandwich Islands, etc.

Vanadium is valued at \$10.00 per lb.

Some Peculiar Features of Bird Life.

BY W. R. LIGHTON, CRESTON, IOWA.

It is a study of by no means secondary interest and importance to note the social and domestic relations of our wild birds; particularly the comparative ability of the several species as tricksters and schemers. It is especially curious to observe the wiles and artifices made use of by some of these highly original creatures during the nesting season to decoy or frighten enemies from the vicinity of their homes.

The Robin and the Thrushes, as simple minded birds as live, though very courageous when engaged in brawls with other species, are exceedingly alarmed whenever their nests are approached by members of the human family, and they will almost universally abandon themselves to the time-worn strategy of flying, with great noise and fluttering of wings, from tree to tree away from the vicinity of the nest, in the rash hope of being able to induce the intruder to follow. The same scheme with some variations and modifications, is in use by a large number of our feather-coated friends; as for example take this bit of the writer's experience.

One day in the summer of 1884 I was passing through an apple orchard in the vicinity of Ottomwa, Iowa,—passing through, mind, if you please—and was deeply absorbed in the beauties of nature in general, and of one red and juicy morsel in particular, when I was startled by a Turtle-dove dropping to the ground from the tree overhead and with piteous cries starting and fluttering along, dragging one wing after it in a helpless fashion in perfect imitation of a compound fracture, and I, forgetting some early

lessons in the manners and customs of the tribe, started after it in hot pursuit. I was led a pretty chase over numberless bush-heaps and several rail fences, the bird always keeping just beyond reach, until we had gone perhaps a hundred and fifty yards, when the wretched little deceiver flew up and away in a manner betaking full possession of its powers of flight. I paused, and after ponderously ruminating for a considerable length of time, came to the conclusion that I had been made the victim of a hoax, and upon retracing my steps and making a careful examination of the tree I found a specimen of the loosely-built nest of twigs and sticks for which the Turtle-dove is so well known. Several times afterwards during the day I tried the same thing over again by way of experiment, and always with the same result. I noticed she always feinted with the same wing—the right one.

This decoy, you see, is the same as that adopted by the Robin, only a good deal more intelligently operated.

It is a popular belief that the Mourning-dove (or Turtle-dove) is in itself symbolical of infinite love and peace, while in reality a more selfish, quarrelsome and totally depraved character it would be hard to find. It is extremely pugnacious, and usually carries its combats to the last extremity.

The Catbird is by no means a lover of peace from principle; it very frequently wages bitter war, but in its fights it does not take advantage of any false reputation to surprise its enemies unaware. The Catbird is not so common here as it is in the Eastern States; its exquisite song is heard only occasionally in this part of Iowa, though it is quite common a hundred miles or so both east and south of Creston.

The English Sparrow has not made its appearance here as yet, though at Ottumwa, only a hundred miles east, the citizens have come to regard the little tyrant as a nuisance. It has increased thereat the usual astonishing rate—has taken complete possession of the town within the past ten years.

The Agassiz Association.

BY "NATURALIST," WASHINGTON, IND.

Very often we receive letters from persons about to join the society, requesting information, and asking what benefit it will be to join. We give the information, and invariably reply, "If you desire to increase your knowledge of the sciences; if you wish to become acquainted with the many objects with which you are surrounded; if you wish, in truth, to become a pupil of old Nature you must study, and you will obtain increased facilities for studying by joining the Association." But study does not necessarily mean labor, for you can get much amusement from your study. The best text-book is everywhere open to you, it is the book of Nature. You may make collections of your own insects, minerals, plants and shells; and by exchanging these with other members, get specimens from almost every State in the Union, as well as many foreign countries. You may make your studies by investigating the habits and means of prevention or destruction of insects injurious to vegetation. You may establish experimental stations for determining to what extent plants from other countries may be cultivated in the United States. If you should enter into this work with the right spirit, the Department of Agriculture would furnish you

seeds and plants. Turn your studies in a practical direction, and you will be aided by persons in all parts of the country. Thus will you make the Association a practical success.

He Expresses Our Idea Exactly.

The following sketch which we clip from the April number of *Tidings from Nature* expresses our sentiments exactly in regard to certain persons who "collect for the advancement (?) of science.

Cleveland, O., March 13.

I saw in the February number of the *Ornithologist and Oologist*, that Mr. Harry G. Parker had visited Chester Island and found long-billed marsh wrens so abundant that he secured one hundred sets of their eggs in a single day. What an infinite amount of good that hundred sets will do to science! And particularly since he probably had not more than a few thousand before. He found the average number of eggs to the set to be six, therefore he secured six hundred eggs that day. It almost seems as though science might compute the average size, color, etc., from the eggs he already had. However, as these eggs are worth about ten cents each, Mr. P. made sixty dollars by destroying six hundred eggs, or birds, for each egg represents a bird, perhaps he thinks himself excuseable. In the same number there appeared another article by Mr. Parker, in which he tells of securing thirty-six sets of Chat's eggs (*SCETERIA VIVENS*) in one day. I will not say what I think of Mr. P., but somehow it reminds me of a paragraph on page seventy-seven of Davie's *Egg Check List*, first edition, referring to a certain class of collectors; something about their relationship to the *Snidae*, though I think that rather too mild for some cases.

S. P. BALDWIN.

A Naturalist Canoeing 200 Miles in the Adirondacks.

BY FALCON.

CHAPTER IX.

After following the winding course of Bog River for five or six miles, we suddenly came upon a place where the river seemed to leave its regular course, and drop down into the earth, leaving the place of its exit outlined against the clear sky. This was Bog River Falls, where the river falls about fifty feet into Tupper's Lake, over a rocky bed. When at a distance, the water dashing over the rocks, resemble an immense snow-bank, in the midst of the green woods. Paddling past the falls, we entered a little canal, and at the end of this, carrying a short distance down a steep incline brought us to Tupper's Lake. This lake was the largest, and next to the longest we had paddled on. It is seven miles long, and the scenery is very picturesque. First paddling to the hotel at the head of the lake, we obtained some supplies, and thence to a rocky headland, where we built a fire and had dinner, after which we spent some time in perusing a daily paper, about a week old, but it was all fresh news to us, as it was the first we had seen after leaving Long Lake, two weeks before. Packing up our cooking utensils again, we got into our canoes and started for the foot of the lake, at which place there was a hotel and quite a settlement. While paddling slowly along the shore, I saw a large "Raptore" pluming himself. Pointing him out to the Professor, who was very desirous of obtaining specimens of this genus for his collection. He landed, but just as he was preparing to fire, the bird left, much to his disgust. He fol-

lowed him along the shore for a short distance, landing once or twice, but all his efforts were in vain; and as he came very near losing his rifle in the water, he abandoned the project. We reached the hotel late in the afternoon and put up for the night. After supper we gathered around the fire, for the air was quite chilly, and amused ourselves with the guides, in trying to find who could tell the biggest yarn. At last the clock struck ten, and we retired, well satisfied with the day's journey.

CHAPTER X.

I was up betimes in the morning, and as breakfast was not ready, started out for a ramble along the shore. I came unexpectedly upon a high bank which was honeycombed with the nests of the Bank Swallow. It being August, and past their breeding time, I did not expect to find any eggs. Judge then of my surprise, when on opening a nest I found three eggs. They were very, very thin shelled, and I presume were laid and left as the Swallows departed for the South. I looked in several of the other holes but found no more eggs. By this time I was well covered with dirt so I went back to the hotel where I found the Professor and breakfast both waiting for me. Breakfast being over, we were again on the water, our destination this time being Follingsby's Pond, where we expected to stay over Sunday. After a mile more on Tupper's Lake we struck the Raquet River, down which we paddled. When we had gone a few miles we were overtaken by a steam launch, which ran between Sweeny's Carry and Tupper's Lake, and invited aboard, which we were very glad to do. We progressed in this way, towing the canoes behind, for quite a distance until

the steamer stopped, when we again took to the water. I must relate an exploit of the Professor's while on the launch, which is a good story, but nevertheless true. An Eagle was sitting on the top of a giant pine which rose for more than a hundred feet into the air. He thought he would try a shot at it, so, with the steamer going ahead full speed, fired. The bullet (which, by the way, was a 44) picked the branch right out from under his Eagleship, who acted very much amazed at such a proceeding. Towards sunset we arrived at the mouth of Follingsby's Brook, which is the outlet to Follingsby's Pond. But this brook—I never shall forget it. It was scarcely three feet wide, and in shape rivaled the most crooked line ever made. No use of getting out and towing your canoe, for if you got on land you would go in mud up to your waist, which would not be very pleasant. After a mile and a half of this pleasant paddle, or rather push, we arrived at Follingsbys Pond, the scenery of which well repaid us for our trouble. Putting up the tent and building a good fire, we had supper; and eight o'clock found us in the land of dreams.

TO BE CONTINUED.

Luminosity of Insects.

BY CHAS. D. PENDELL, WAVERLY, N. Y.

Luminosity or phosphorescence is common to many substances, especially to decaying animal and vegetable matter. In the tropical seas, is a minute animal resembling a very small cylinder of glowing phosphorous, which sometimes occurs in such numbers that the ocean appears like an immense molten sea of fire. Dr. Phipson relates that he

has found a species of the rhizopoda, *NOCTILUCA MILIARIS*, a minute animal very common in the English Channel, "in such prodigious numbers in the damp sand at Ostend, that on rising a handful of it, it appeared like so much molten lava." These examples illustrate a remarkable phenomenon by no means confined to marine life. It is slightly manifest in a large number of beetles and some moths; but in certain species of insects this is exhibited to a surprising degree.

The common glow worm is the wingless female of a certain coleopterous insect. The male emits this phosphorescence slightly, but in the female it is quite strong; and it is probable that it can display or extinguish its light at pleasure. The habits of the insect are nocturnal and it is generally to be found during the summer months among grass or on mossy banks. If the luminous portion be placed in hydrogen gas it causes quite a detonation.

Every one has seen the common fire-fly, which causes our lawns to assume the appearance of a starry firmament. This interesting insect is widely scattered on this continent and a similar variety is found in Europe.

But in tropical America, where insect life reaches the acme of developement, there are phosphorescent insects of far superior splendor. There we find the great lantern-fly which has two prolongations from its forehead that gleam with a brilliancy sufficient to enable one to read the smallest print. By placing several of these luminous beetles together in a glass bottle their monstrous heads will furnish sufficient light for the illumination of a room.

The West India Islands are also inhabited by several species of this re-

markable phosgene insect, which the people daily utilize. Travelers there, on a difficult road, illuminate their path by attaching one of these beetles to each of their feet, or by tying several to a stick and carrying it as a lantern. The creoles set them in the curls of their hair, and there, like resplendent jewels, they give a fairy-like aspect to the head of the wearer. The negresses, in their nocturnal dances, fasten these brilliant insects over their robes of lace, woven from soft bark, and in their rapid and graceful movements they seem enveloped in a robe of fire.

Science has not yet succeeded in explaining the cause of this luminosity. Certain centipedes possess this peculiarity but with the singular modification that it must first be exposed to sunlight. Carus, the German anatomist, has discovered that even the eggs of some of the foregoing insects are luminous; which certainly is a very curious fact and one which may throw some light on the cause of their phantom brightness.

Gems of the United States.

BY G. D. STORY, CARTERVILLE, MO.

It is a remarkable circumstance that although this country is so rich in its mineral resources, and that the world draws from us a great part of its supply of the precious metals, we have so far discovered here only an insignificant quantity of precious stones. The total value of the gems proper, mined in the United States in 1884, was less than \$30,000, and yet we imported during the same year more than \$9,000,000 worth of diamonds and other precious stones.

Diamonds it seems have been found

in various parts of the country but chiefly in California and North Carolina, though the largest diamond yet discovered here was dug up by a laborer, thirty or more years ago, in Manchester, Va. This stone, not at first recognized, originally weighed $23\frac{3}{4}$ carats, and when reduced by cutting, 11 11-16 carats, and it was deemed so valuable that at one time \$6,000 was loaned on it, though because of its imperfections and undesirable color it is not worth more than a twentieth part of that sum. The California diamonds, found in fifteen or twenty different places, the most prolific being Cherokee Flats, Butte county, are of all the colors known in the stone—white, yellow, straw and rose—but they are generally very small ranging in value from \$10 to \$50 each. The largest, discovered at French Corral, weighs seven and a quarter carats, and many are unearthed whose value in the rough is not less than \$100. Diamonds are always found in North Carolina in association with the flexible sandstone, called itacolumite, which is peculiar to that state, where, too, sapphires of notable brilliancy have appeared. A sapphire found at Jenks' mine, in Franklin county, is one of the finest known specimens of the emerald-green variety and because of its great rarity is probably worth \$1,000. Fine specimens of chryso-beryl, a stone which sometimes is almost equal in appearance to the yellow diamond, and is principally obtained in Brazil and Ceylon, have been found in different parts of New England, New York and the Southern states, and the spineal, a beautiful gem which is often sold for oriental ruby, is distributed in the same way. The best crystals of topaz come from the Platte Mountains in Colorado, one of these, weighing 125 carats, being an ex-

traordinarily fine gem. Only insignificant quantities of emeralds and beryls have been found within our boundaries, but garnets, which although smaller, are equal to the best of Africa and Ceylon, are discovered on the Colorado River plateau. The amethyst is quite common in New England, and appears in several places in the Southern States. One specimen, found near Cheshire, in Connecticut, rivals in color the best amethyst of Siberia; but the most remarkable native amethyst is that lately deposited in the National Museum by Dr. Lucas. It is a turtle-shaped, prehistoric cutting, $2\frac{3}{4}$ inches in length, 2 inches in width and $1\frac{1}{2}$ inches in thickness, is transparent and flawless. Of all the gem stones, however, the greatest revenue in 1884, \$10,000, comes from smoky quartz, the finest specimens of which are found at Bear Creek, in Colorado. There are also many beautiful examples of less valuable stones which are in demand for cabinet collections, such as green feldspar, or Amazon stone, found at Pike's Peak.

The Birds.

BY JUSTIN PRICE, MAUSTON, WIS.

Birds constitute the second class of vertebrated animals. They are the most favored of all animals in their powers of locomotion, yet like the mammalia most species are confined by geographical laws to particular districts. The most beautiful birds are found within the tropics, where with the exceptions of two orders—the waders and swimmers—the number of species and individuals are the greatest. Birds are divided by the great French naturalist, Cuvier, into the following six orders:

1. RAPACES (birds of prey)—hawks and eagles.
2. SCANSORES (climbers)—parrots and woodpeckers.
3. OSCINES (songsters)—robins and larks.
4. GALLINACEA (gallina, a hen)—domestic hen.
5. GRALLATOIRES (waders)—snipe and heron.
6. NATATOIRES (swimmers)—duck and penguin.

Rapacers, the principal birds of prey, are vultures, eagles, hawks and owls. The vulture is the largest flying bird, sometimes measuring fifteen feet from tip to tip of wings. Humboldt saw this bird floating over the summit of Mt. Chiniborazo, at an elevation of 22,000 feet. Scansores—Parrots, toucans and woodpeckers are the principal birds of this order. Woodpeckers are largely spread, being found in every quarter of the globe except Australia. Oscines are the most numerous order of birds, and include those most generally known in temperate regions, as the lark, thrush, robin and sparrow. Gallinacea—Birds of this order are more numerous in the Old World than in this country. Quail, pheasants, and pigeon are gallinaceous birds. Grallatores and Natatores, the waders and swimmers are far more numerous in the Polar and Temperate regions than in the Tropics. However the most remarkable species occur in the tropical climate. The South American and African ostrich, the cassowary, and Australian emu are the most gigantic of birds. The migration of birds is an interesting feature in natural history. Alexander Wilson estimated a flock of pigeons which passed over him while in Canada, to have been a mile in breadth, 240 miles in length, and to have contained 2,230,272,000 pigeons, three birds having been assigned to the square yard.

Alexander Wilson.

BY PHINEAS COBB, JR.

The name of Alexander Wilson, the noted ornithologist, is dear to every admirer of genius, and to all students of bird life.

He was born in Paisley, Scotland, on the 6th of July, 1766. He was intended by his parents for the church, but his mother, with whom the idea seems to have originated, suddenly died, and with her perished the young man's hopes for filling the position he had been taught to aspire.

In his thirteenth year he was apprenticed to a weaver, an engagement which lasted three years. For four years after this Wilson was employed as a journeyman weaver.

In his twentieth year a new calling opened up to Wilson. William Duncan, his brother-in-law, with whom he was employed, having deserted the weaving business in order to follow out a mercantile speculation on the eastern coast of Scotland, Wilson determined to follow his example. He accordingly devoted himself to the wandering life of a peddler, an occupation then more frequently followed than at present.

He did not succeed very well in his last venture, and finally concluded to leave Scotland; and being almost penniless he fell to weaving again, and for four months worked incessantly at the loom, during which time he managed to save enough to pay his passage to America, where he landed at Newcastle, in the State of Delaware, on the 14th day of July, 1794.

He wandered around, following numerous occupations, and finally opened a school and for several years, in differ-

ent places, taught with great efficiency and success, and finally we find him appointed teacher of a union school in the town of Kingsessing, not far from Philadelphia. It was while teaching here that he became acquainted with a kindred spirit by the name of Bartram, an amiable, self-taught naturalist.

The love of nature which had always characterized Wilson here seems to have taken firm root, and his scholars brought him all sorts of specimens.

He wrote a letter to a friend—"A boy not long ago brought me a large basket full of crows. I expect his next load will be bull-frogs if I don't soon issue orders to the contrary.

In September, 1808, the first volume of his great work, "The American Ornithology," made its appearance. The design and execution of the work have been truly described as magnificent; and yet notwithstanding that it took the public by surprise, the sale of the first numbers was very small. The second volume made its appearance some fifteen months later, and during the following two years he completed four more volumes of his work. The seventh volume was finished early in 1813. The eighth volume was announced to appear in the fall of 1814, and another volume was intended to conclude the work, but the gifted author was not destined to see the completion of his work, for his career came suddenly to an end.

The cause which led to his death was this: Sitting one day conversing with a friend, a rare bird which he had for a long time wished to possess happened to fly past the window. The moment Wilson beheld it he seized his gun and pursued it, during which he swam across a river. He caught a severe cold which was followed by a severe attack of dysentery, which after ten days brought his life to an end. He died August 23rd, 1813. A beautiful thought that he often expressed, which showed his love for nature, was that he might be buried in some rural spot where the birds might sing over his grave.

THE NATURALISTS' COMPANION.



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We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

RANDOM NOTES.

Mr. F. S. Burch, Chicago, Ills., has our thanks for a copy of his fine illustrated catalogue of sea shells.

We cannot possibly furnish our readers with a file of back numbers, as we have but a few odd ones left.

We made an error in our last issue in stating that on March 21st we saw a flock of Brewer's Blackbirds. It should have read Rusty Blackbirds.

Mr. S. Jacob, naturalist, Newport, R. I., informs us that he is fitting up a store at that place, which when complete will be the largest store in the United States devoted to natural history. We wish him the best of success.

How do you like the appearance of this number ; is it not improving?

We sincerely welcome the Buckeye Naturalist, of Bellville, Ohio.

It is with deep regret that we learn that Tidings from Nature, after issuing nineteen numbers, has discontinued publication, Its subscription list, and also that of the late Ornithologist have been transferred to that of the Hoosier Naturalist.

Some of the mound builders' best production of art are their pipes. In many of these they have shown remarkable skill. Birds, such as eagles, turkeys and smaller birds, otters, foxes, frogs, etc., as well as the human face are represented in the make of a great number of pipes.

We have decided not to publish the article on "Eggs and Egg Collecting" as announced in our last number, as we have noticed that nearly every natural history paper published has had a serial on the subject, therefore it would be a waste of space for us to publish one on the same subject.

Now that spring is here, the archæologist can begin work. Visit new plowed fields. The best time is just after a moderate rain shower. Arrow-points can easily be seen then, as can all other relics, for the rain washes the dirt off them and their red, white, gray or black colors are clearly desernable.

The following is an extract from a letter recently received from Mr. J. E. Jones, St. Johnsbury, Vt., former publisher of the Naturalists' Bullentin :

"I think the COMPANION by far the neatest, best and most profitable paper ever placed in the hands of the collector. It deals fair with its subscribers, and handles the various subjects with an experienced hand. Long may it live."

Entomologists should bear in mind that the season to "sugar" formoths has arrived. We captured a number of fine specimens in a few evening's work.

Parties in need of Fine Job Printing at extremely low prices. We do all kinds of printing, including circulars, price-lists, tags, catalogues, letter and bill heads, envelopes, statements, papers, etc. Satisfaction guaranteed.

We would sincerely recommend the Agassiz Association Hand-book, advertised in another column. It is handsomely bound in cloth and contains instructions for preserving, mounting, and studying the different objects of natural history, as well as the addresses of the different chapters and other useful knowledge indispensable to the naturalist.

Prof. C. H. Jenner, of this place, is at present engaged on a new work, "The Book of Nature as Read in the Light of Electricity," which will shortly appear in print. The book will undoubtedly be a grand success with so able and well informed a person as Professor Jenner as its author. He is also author of "The Earth; its Formation out of Chaotic Elements, etc.," "New Principles of Vessel Propelling," "New Theories of Planetary Propulsion," &c.

It is said that alligators' eggs are esteemed by the natives of the regions where those reptiles abound: Mr. Joseph, in his "History of Trinidad," says that he found the eggs of the cayman very good. The female alligator lays from 120 to 160 eggs. They are about as large as the eggs of a tukey, and have a rough shell filled with a thick albumen.—SUNNY SOUTH OOLOGIST.

Papers desiring to suspend can transfer their business to ours on most favorable terms. Write for particulars.

Archaeological Journalism.

There is no journal, amateur we refer to, published wholly in the interest of archæology. Why is it? Simply because there are not enough young collectors to support such a publication. The Young Mineralogist and Antiquarian, as did the Hoosier Mineralogist and Archæologist and the Museum, devoted at least one half of their space to archæological news. Yet these three journals, priced respectfully 75c, 25c and \$1.50, have each failed during 1885-86. The Young Mineralogist and Antiquarian issued eleven numbers and retired in July. Then the Museum in September. Although there is a department entitled the Museum, edited by the former publisher of that paper, in the American Antiquarian, yet that paper does not find its way, as it should, into the hands of young collectors. Then in January, 1886, came the retirement of the Hoosier Mineralogist and Archæologist. Twelve numbers were issued of this paper. Each of the three above named publications, as we said before, devoted half of their space to archæological news, and it was always of the highest order. Each had among its contributors not only amateurs, but the most eminent scientists of the day, such as Dr. Brinton, Dr. Abbott, Rev. H. Hovey, Prof. Richard Owen, Mr. Binkley, and others of equal fame. The Southern Geologist started out with an archæological department, but owing to the place it is endeavoring to, and is, filling in the South, as that of a journal devoted to its mineral resources, it is compelled to drop the department and only occasionally devote space to that subject. As there is at present no paper in our fold devoting any great amount of space to arch-

æology, we propose to do more in this line, and in the future promise our readers articles from the pens of some of the most noted scientists of our time, as well as numerous noted collectors. Let every archæologist subscribe for the COMPANION now, for the faster the subscriptions come in, the sooner the department will be increased. We will not allow this department to trespass on the rights of our natural history friends, however, for, as may be seen, we have with this issue increased the size of the paper four pages.

CORRESPONDENCE.

EDITOR NATURALISTS' COMPANION.

You spoke of sending reports of bird arrivals in your last issue. I will send you mine up to April 4th.

Feb. 11th.—Shore Lark.

Feb. 13th.—Lapland Longspur.

March 14th.—Meadow Lark, Bluebird and Killdeer.

March 17th.—Black Snowbird, Crow Blackbird and Great White Egret.

March 18th.—Red-wing Blackbird, Robins and Song Sparrow.

March 19th.—American Woodcock.

March 20th.—Pewee Flycatcher, Fox Sparrow and Horned Grebe.

March 27th.—Black-crowned Night Heron and Brown Creeper.

April 1st.—Cowbird and Wild Pigeon.

April 2nd.—Hermit Thrush.

April 3rd.—Mourning Dove and Yellow-shafted Flicker.

G. B. HOLMES, Fernwood, Ills.

While passing along the street, a few days since, I noticed a robin hanging head downward from a limb of a tree. I at first thought that the bird had been injured, and falling from above had caught on the limb. On closer inspec-

tion, however, I found that its feet were tangled up in thread which it had been carrying to aid in the completion of its nest. I climbed up to the limb, and reaching out, broke the threads, and with a squack, which might have been a robin's thanks, it flew quickly away.

ALFRED G. KING, Brockport, N. Y.

I send you the following notes just as I have them down in my note book.

Feb. 22nd.—First Wild Geese seen going north.

March 9th.—Saw the first Robin this spring.

March 16th.—Blackbirds and Meadow Larks arriving to-day.

March 24th.—Saw two pair of Killdeer Plover to-day.

April 8th.—Curlews arriving from the South.

April 9th.—Found a Crow's nest quite complete.

April 11th.—Kingfishers arrived to-day, also a pair of Turtle Doves. Blackbirds have commenced to build their nests.

ERNEST OSTROM,
Danbury, Iowa.

The following is a list of the arrivals of birds in this vicinity, taken since our last report :

April 11th.—White-bellied Swallow, and Red-and-buff-shouldered Blackbird.

April 13th.—Pewee Flycatcher, Rusty Blackbird and Snow Sparrow.

April 18th.—Wild Pigeon, Red-headed Woodpecker, Purple Grackle, Kingfisher and White-rumped Shrike. Saw first butterflies of the season—grapta comma and vanessa antiopa.

YE EDITOR.

Should you receive more than one number of this paper please hand the extras to some friend.

ARCHAEOLOGY.

This department is conducted by JOSEPH WIGGLESWORTH, Wilmington, Del., to whom all articles pertaining to the subject should be addressed.

BRIER HILL; AN OLD BATTLE-FIELD.

Brier Hill is situated about a quarter of a mile east of the village of Newport, in Newcastle County, Delaware. It is a slight elevation about twenty-five feet above the low-water level of the Christian Creek, a broad stream which flows at its base. By the number of relics found at this place it was a favorite resort of the Indians; undoubtedly being one of their best fishing grounds. A very large amount of fragmentary pottery has been found at this locality, all of it being found on the south-eastern side of the hill. This goes to prove that they remained there all winter, as well as the summer, because they pitched their tepees on the south-eastern slope of the hill to shield them from the cold "north-westers." About two hundred yards west of Brier Hill is another small hill, leaving a plateau-like valley between. On the western slope of Brier Hill and the eastern slope of the other hill many war-points are found, a few also being found in the valley between them. Now to the young collector, the location of these war-points would show nothing, but he would simply return home exultant over his finds without ever giving their location a single thought. The farmer also would merely pick them up, remark that it was curious how the Indians made them, without suspecting the knowledge they conveyed to others. But the location of these war-points proves much to the old archæologist. It tells him that, at one time, there was a

battle fought at that locality between two tribes of the aborigines, and that one tribe commanded one hill and their enemies the other. The points found in the valley are those that fell short of their mark, while the ones found on the hillsides are those that dealt death and destruction to the ranks of the Indians.

A Collecting Trip to Brinton's Quarries.

BY H. R. SHARPLES, WEST CHESTER, PA.

About two days ago a friend of mine invited me to take a trip to Brinton's quarries, situated three miles below West Chester, for the purpose of getting some pure specimens of serpentine, soapstone, red flint and mica, and mixtures of granite and limestone, mica and limestone, and limestone and rock crystals. On the way down we saw numbers of field sparrows, pewees, and a pair of turtle doves. We at last reached the quarries, and after procuring all the specimens desired, we started for home much pleased with our trip.

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Job Printing executed neatly by us.

Reader, if you are not a subscriber, do not lay this paper down after reading it with the expectancy of receiving another copy, for you certainly will not unless you subscribe. Note the subscription price—the cheapest of any natural history paper published in the world—peruse the contents, and then consider if the magazine is not fully worth twice the small sum asked, and would you not receive far greater returns for that amount of money than were it otherwise invested. Think it over, please.

QUERIES AND ANSWERS.

To R. D. Goss, New Sharon, Iowa.
The birds described by you in the last issue of the COMPANION were Black-headed Grosbeaks (*GONIAPHEA MELAN- OCEPHALA*).

DAVID BRUCE,
Brockport, N. Y.

Mr. Bruce kindly presented us with the skin of one of these birds, and we find that the description fits exactly—[ED

—O—

We have a number of other questions which we will endeavor to answer in our May number.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—ED.

CHAS. D. PENDELL, Waverly, N. Y.—
Will give a bargain in good minerals or books for a Dana's Mineralogy.

—O—

H. R. SHARPLES, box 1968, West Chester, Pa.—12 different stamps for every good labeled mineral or arrowhead.

—O—

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BEN CLAWSON, Washington, Indiana.

—O—

G. D. STORY, Cartersville, Mo.—Minerals, woods and curiosities, to exchange for minerals, fossils, coins, fractional currency, Indian relics, ocean curiosities, match, medicine, playing card and revenue stamps and curiosities of all kinds.

—O—

W. G. TALMADGE, Plymouth, Conn.—A Leicester scroll saw (without lathe), with ten dozen saws, a pair of No. 1

climbing irons, with straps, a 48 inch (Horseman) Ideal bicycle, steel spokes and rubber tire, Vol. 1 Young Oologist (bound) and 75 rare American eggs, all different in a 6 drawer blackwalnut cabinet; lot valued at \$50, for a foot-power lathe, Barnes No. 4 or Providence preferred, 6, 7 or 8 inch swing with slide rest, drill chucks, etc., in first class order.

Historical Geology.

A SERIAL.

BY FRANKLIN C. JOHNSON.

CHAPTER VII.

CENOZOIC TIME.

This time comprises but one age, that of mammals.

Enormous animals roam over the land, wild horses prance over the plains, foxes chase their prey, birds sing in the trees, and fishes splash merrily in the water.

This age is divided into two periods, as follows:

AGE OF MAMMALS	2. Post-Tertiary Period.
	3. Tertiary Period.

TERTIARY PERIOD.

The marine Tertiary beds are on the borders of the Atlantic, Pacific, and on the Gulf of Mexico. Fresh water Tertiary beds are found among the Rocky Mountains and in the Upper Missouri region.

The rocks are mostly marl, pebbles, clay, sand, etc.

Beds of light bituminous coal are found in many places.

The land had an abundance of vegetation. The oak, poplar, maple, hickory, mulberry, and many other trees have been found. Nuts are common in some localities, as at Brandon, Vt.

Three thousand species of Tertiary shells have been found in America.

Bees appear for the first time during this period.

Insects of all kinds are numerous.

The bones of a species of whale, called the ZEUGLUDON are plentiful.

Hundreds of fossil turtles are found in the rocks of this period.

The remains of the hyena, dog, panther, rhinoceros, tapir, horse, and numerous other animals have been found in the beds of the "Bad Lands," on the White River, in the Upper Missouri region and other places in the West.

POST-TERTIARY PERIOD.

QUATERNARY EPOCH.

The Post-Tertiary Period is divided into three other periods, namely: (1) Glacial Period, (2) Champlain Period, (3) Terrace Period.

I. GLACIAL PERIOD.

The continent of America, which began by a V shaped strip of land, was now finished out very nearly to its present limits.

The periods of fire and water have been; now comes the period of ice.

The earth has until now had a tropical climate, but now comes a time of arctic winter

The earth became covered with immense glaciers. These rolled slowly over the land, crushing all that came in their way. But often large rocks and stones became fastened in them or fall upon them. These are carried along until the glacier melts and they are released. In this manner stones, gravel, earth, etc., were transported from one place to another a long distance from it.

This transported material is called drift. This drift includes all the loose unstratified deposits of gravel, sand, clay and stones which are so common in the

Northern States. It extends south to the latitude of 39° and west to the Rocky Mountains. The stones are of all sizes, from large boulders weighing 3,400 tons to small cobble-stones.

II. CHAMPLAIN AND TERRACE PERIODS.

Winter is over and spring is here. The glaciers feel the heat and melt before it. As the glaciers melt, the water hastens in torrents to the ocean.

Vegetation wakes up again after the long winter. Animals appear in great numbers. The Mississippi valley is all one gigantic river rushing toward the Gulf of Mexico. Slowly the continent rises from the waters. The rivers dig deep channels in the soft deposit of the valleys, leaving their old channels higher up, thus forming natural terraces. One can see these terraces on the banks of almost any large river. These terrace-plains are often the sites of villages, many of which owe their beauty to them.

TO BE CONTINUED.

The Young Ornithologist has suspended. Bro. Eds., 'tis getting lonesome, but guess we wont follow suit; no, never.

We have a number of fine articles, generously contributed by our friends, for our May number.

WANTED. We are at present engaged in compiling a Naturalists' Handbook, which, when complete, will contain full instructions for preserving and mounting all kinds of natural history specimens as well as various recipes useful to the naturalist. Persons possessing any directions for preparing specimens or recipes for making compositions will please send us the same with price, which if we accept, we will promptly remit. If you desire it returned in case we do not accept it or should already have the same, please inclose a 2c stamp.

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VOL. I.

BROCKPORT, N. Y., MAY, 1886.

NO. II.

The Seal and the Sea Mew.

The Seal on a floe of ice as he lay
Did thus to the whirling Sea Mew say:
"Mr. Mew, if I had such wings as those,
I would fly to the sun and warm my nose,"
And the Mew said, "Yes, just so thought I
How pleasant it must be up in the sky;
But the higher I went the colder it grew,
So I turned from the sun, and came down
to you."

The colder it grew, though the sun's so hot
A proper puzzle the Seal has got.
And he lies on his side and thinks it o'er,
Till he falls asleep, and begins to snore;
But still in his sealish brain there runs
A kind of a dream of wings and suns.

A Walk with a Purpose.

BY AVIS.

Let us go for a walk to the woods
this bright, mild April day.

The exercise, the welcome sight of
the sun's bright face after it has been
hidden from us so long, the warmth of
his rays, and the faint fresh grassy smell
peculiar to early spring, all these are to
be enjoyed if one has only enjoyment
in view; but some of us wish to start an
herbarium this year and we are going to
search for our first specimens.

So providing ourselves with a tin lunch
box, one that folds up so it can be car-
ried in the pocket is best, a trowel and
a knife, we set forth.

The lunch box will be used to hold
the specimens after they are gathered,
and if they are placed carefully and the

box is kept closed they will remain fresh
several hours. The trowel will be use-
ful to dig up the roots of the plants we
wish to examine.

The first flower we will be likely to
find is the hepatica, or liver leaf, a plant
which may be said to do its spring work
in the fall, as, unlike most plants, its
leaves and flower buds are fully formed
in the fall, and being protected by the
dry leaves of the woods, are carried
safely through the winter and are thus
ready to show their dainty blossoms al-
most before the snow is gone, and while
the other plants, like the violet, are just
waking from their long sleep and pro-
ceeding to develop leaves and flowers
from the mold.

But no! one of our party has found
in a moist, sunny corner of the woods a
delicate little plant, bearing rose-color-
ed blossoms, and which she calls a spring
beauty. We recognize it to be the
Claytonia, an example of our native
purslane, a genus of plants belonging to
the order of Portulacaceae as it has the
two-cleft calyx, the requisite number of
petals and stamens, etc. One can hardly
believe that it is a near relative of the
purslane of our gardens which is so pro-
voking to the gardeners that it has passed
into proverb, and anything that is "as
mean as pusley" is almost beyond com-
prehension.

Such is the fact, however. Relatives
they are, and the family resemblance is
strong when one considers the points

which so well characterize the family.

Taking the plant up carefully, we shake the earth from its roots, and place it in the box, to be examined more thoroughly and named after we reach home.

Farther on in the woods we find quantities of this kind of plant, and of the hepatica, with occasionally a stray adder tongue, for it is rather early for them as yet. The dicentra, saxifrage and other plants are in abundance, but as their buds have not opened, we leave them for another time, and return home well pleased with the success of our expedition.

The next thing is to name the specimens with the aid of a good botany. If the characteristics of the principal families are memorized now, it will save a great deal of bother in the future, as one can then place a plant in its family independent of the botany. After the specimens are named they should be put in the press immediately, as they do not look well if pressed after they become wilted. I think one can buy a kind of porous paper prepared expressly for people who prefer it in pressing flowers; but I used newspapers with good success.

My method was as follows: After naming the plant, I placed it carefully, face downward, upon a newspaper folded double, straightened the leaves and arranged the buds and flowers. I then placed a slip of paper with the specimen, giving its name and the family to which it belonged; also where found and the date. This was done to guard against my forgetting anything I wished to know of the plant. The paper was then laid on a flat surface, and others placed with it, a board and a heavy weight surmounting the pile, and they were then left to themselves for a day or two until it was time to change the papers. If the

weather is damp this should be done each day or the plants will mold, but if hot and dry they will do very well if left two or even three days at a time. When the plants are thoroughly dry they are ready to be mounted. One should now be provided with the sheets of bristol-board manufactured for this purpose, and which can be obtained at little expense; a sheet of white court plaster, a bottle of glue and a pair of sharp scissors. Place the plant in the centre of the sheet of bristol-board, then cut bits of the court plaster long enough to hold the stems down and a little less than an eighth of an inch wide. Moisten and place the two strips over each stem, unless it is short when one will do; one near the flower and the other near the stalk. Now place a little glue on the back of each leaf, bud and flower, press gently into place, and put away to dry. After it is dried all you have left to do is to place the name of the plant, date when gathered, and your own name, in this order: First, generic name; second, specific name, followed by the common name; third, where gathered; fourth, your own name, thus:—

LILIACEAE.

TRILLIUM GRANDIFLORUM,

(WAKE ROBIN)

East Woods, Brockport, N. Y.

MARY SMITH.

April 13th, 1886.

This should be placed in the lower right hand corner of the sheet. Of course part of the label can be omitted if desired, but I give it as I arranged

my specimens, under the eye of a competent teacher, I hope those of you who accompanied me to the woods to-day in search of your first specimens will not get discouraged if you fail once in a while, you must expect to; but try again and you will be successful in the end. I also hope you will really enjoy the making of your herbarium, and when at the close of the summer you look at your hard-earned specimens I am assured you will feel well paid for your trouble.

A Giant Sea Turtle.

FROM ST. NICHOLAS.

The discovery of a gigantic extinct sea turtle found near Fort Wallis, in Western Kansas, first observed the bony shields projecting from a bluff near Butte Creek. They were carefully taken out and brought to Philadelphia, where the restoration was made. The fore flippers alone were nearly five feet long, while its expanse from the tip of one extended flipper to another was about seventeen feet. The question may arise: How did the sea turtle become buried in a bluff in the State of Kansas? A natural supposition would be that Kansas is the bed of a former ocean, and so it is.

Agas ago, in what is called by geologists the Cretaceous period, that part of the world was the bed of a great sea, in which the great turtle swam, together with other monsters of curious shape and appearance. Gradually the crust of the earth was raised, the water fell back or became inclosed, and left the inhabitants of the Cretaceous sea high and dry, to be covered by the earth and preserved for us to study ages afterward.

The shores of this ancient ocean are easily found and followed by geologists. Its extent has been traced on our western plains by the bleaching and disintegrating remains which have been found, upon and beneath the surface.

There were Giants in those Days.

In digging recently at Rockaway, L. I., a number of bones were found, making three almost complete human skeletons. On measuring them it was found that they must have belonged to a race of giants. One was six feet eleven inches in height. The find was a most interesting one, as the other scattered remains were also evident of a race of very tall human beings. Some pottery was found near the skeletons, some arrow heads, and nearby were heaps of oyster and clam shells, showing that at the time the bodies were buried the surface was far below what it is now. The remains of the teeth and skull would seem to indicate a somewhat lower mentality and different eating habits from the aboriginal race found in this country by the whites on their first landing. When this continent has been thoroughly explored, no doubt much light will be thrown upon the early races with which it was inhabited. Nations and tribes differ in stature quite as much as in habits and mental development. There is to-day a race of pigmy men in Central Africa, and there have undoubtedly been tribes of very tall men among the savages who first peopled this as well as other continents.

Peruse the contents of this issue carefully and compare the price with any other natural history paper. Which is the best for the money?

The Sensitive Plant.

BY HARRY HARRIS.

The sensitive plant is a name commonly given to very delicate species of the MIMOSA on account of the peculiar phenomena which is exhibited in their pinnæ or leaves and stalk when touched or shaken. All species of the MIMOSA possess this singular property to a greater or less degree, but is more particularly noticeable in the half-shrubby, herbaceous plants, indigenous to our western prairies and also to the llanos of Brazil, where the stems are prickly, and some of the species possess small heads of beautiful rose-colored flowers. This plant is one of the most peculiar plants found in nature, and upon being approached in its wild state, lifts its head, seems to look at you very appealingly, and then drops suddenly, shrinking back in great alarm, its leaves and stem appearing to wilt under your raptured gaze. After you have passed on, the earth having ceased its vibrations, the plant raises its head, quivering and trembling, as if not fully recovered from its shock, and in a few moments it is all right again.

Large California Gold Nuggets.

BY DR. BENJ. F. MASON, SAN LEANDRO, CAL.

The largest nugget of gold ever yet discovered in California, was found in Sierra County, about ten miles from Downsville, by John J. Finney. It was a solid mass of gold and weighed 5,120 ounces, but not being compact it was broken in removing. This nugget furnished nearly \$90,000 worth of pure gold. Another nugget, found in early days in

California, weighed 134 pounds and seven ounces, and afforded 109 pounds and eleven ounces of the pure metal; it was sold for \$27,650. In 1860 a nugget weighing 1596 ounces was taken from the Monumental Mine, Sierra Buttes the value of which was estimated at \$25,000. Another large nugget, worth \$22,000, was taken from the Rainbow Mine, in Chipp's Flat, in 1881. In 1858 a nugget was taken from French Ravine, weighing 532 ounces, and yielding \$10,000 worth of gold. In the same ravine, in 1851, a nugget was found weighing 436 ounces, and worth about \$8,000.

Let us now turn to geology and learn how these huge nuggets of gold were deposited in pockets, for they are all found in pockets, or near them, from whence they have originally been dislodged by some mountain torrent, or avalanche.

It is a well-known fact that these placer diggings, or superficial deposits, have furnished nine-tenths of the gold mined from the earth, all of the platinum, iridium, osmium and rhodium; most of the tin; and also all gems, with the exception of the emerald, which is sometimes mined from veins. These superficial deposits usually lie along the foothills of mountain ranges, and are the product of ages of erosion, caused by frost, rain and snow, which are constantly wearing the mountain's sides and summits, and sweeping the debris into the valley or ocean below.

There is another way in which the gold becomes free from the gangue, this is by shore waves wearing away the rocks against which they have dashed, producing large accumulations of detritus containing gold, platinum and gems. And when the ocean beach becomes

raised above the sea, it is often found to be a rich mining ground. Instances of this are seen on the coast of Oregon, where the beach yields quite a large quantity of gold and platinum; and again in the Black Hills, where the old Potsdam Sandstone beach, formed by the detritus from the beating of the Silurian Sea waves upon the auriferous quartz-veined cliffs of the Laurentian and Huronian rocks, have formed a rich mining field.

But the huge California nuggets were not thus formed. They never were in veins, therefore could not have been produced by the desintegration of the veins. These nuggets are so differently characterized from the placer gold that they could not have been derived from the quartz veins. Then how were these great nuggets deposited?

It is a well authenticated geological fact that the Pacific Coast was once the bed of the ocean—as were all extensive gold fields. It is also plainly seen that all extensive gold bearing fields have been subject to extensive igneous action, as the volcanic rocks plainly show. Now, there was a period—and, geologically speaking, not so very remote—when the volcanic fires along the western coast of America caused the entire ocean border to boil from the northern to the southern extremities.

Now, sea water contains two and one-half pounds of salt to every one hundred pounds of water—and salt is, chemically speaking, chlorid of sodium, that is, consists of chlorine gas and sodium. Gold and silver are soluble in chlorine, and when the ocean was boiling hot the chlorine was either freed from the salt by the heat, or by the sulphuric acid and oxide of manganese, that the volcanoes belched forth or produced, and

this free chlorine dissolved both the gold and silver. This accounts for these gold nuggets never being free from silver. As the ocean grew cooler, the next step was precipitation. The free gold and silver was probably precipitated by potash or a similar chemical, and that enclosed in sulphates by sulphate of iron, while the chlorine evaporated to become again united in the salt.

And then, were deposited by the whirling eddies of this boiling sea, the huge nuggets in revines and narrow confined vales—for the gold lumps are never found on mountain tops or in open plains. Into crevices, or apertures, in these ravines or vales, flowed the silica, which during the long continuous action of heated water and acids, have been dissolved from the neighboring rocks. Into these huge pockets of soft quartz were gradually precipitated by the eddies produced by the conformation, the huge masses of gold.

But where did the gold and silver come from? They were obtained from the sea. All oceans, even those of the present day, contain gold, silver and copper.

Some ten years ago, two noted French chemists demonstrated that the ocean contained a notable amount of silver in solution. Since then other chemists have verified these French philosophers' experiments, in other parts of the world. Notable among these the celebrated chemist, Field, who resides at Coquimbo, in Chili. The water he took from the Pacific Ocean gave the same results as that obtained from the English Channel, off St. Malo, in France. After the experiments of many chemists, it has been demonstrated by careful calculation, that the whole ocean cannot contain less than two millions of tons of silver in solution.

One method of extracting the silver from the sea is by simple affinity. Granulated copper is suspended in the deep, and the silver salt contained there is dissolved and the silver is precipitated thereon, from which it is separated in the laboratory.

The sea is also known to contain copper in large quantities. From experiments made by the English chemist, Piesse, he declared that the blue color of parts of the Mediterranean Sea is due to ammonical salts of copper, while the greenness of others is due to the chloride of copper. Not only are copper and silver found in the sea, but also gold.

By a number of experiments made with the ocean's water, in different parts of the world, by chemists (myself among the number) we find by careful computation that the oceans of the globe cannot contain less than a hundred thousand tons of gold in solution.

It is, therefore, not difficult to chemically account for the precipitation and deposit of these gold nuggets in pockets or crevices by the whirling eddies of that boiling sea.

CORRESPONDENCE.

I have about 400 arrowpoints, all found on father's farm of 160 acres. I also have two axes, four hatchets, one tomahawk and a number of minor implements all stone. The smaller axe has "G. W. 1732" cut into it deeply. It has been cut on a long time, as it is considerably disintegrated although found a couple of feet below the surface.

H. E. DEATS, Flemington, N. J.

Last summer I found a nest of the Cedarbird composed entirely of chestnut blossoms, and a Black-billed Cuckoo's nest partly of the same material.

I found a Chewink's nest containing three eggs and one of the Cowbird, within twenty-five feet of a watering trough by the side of a road. One of my friends found a two-storied nest of the Pewee. I also collected a set of 6 Meadow Lark's eggs, 5 of Catbird, 5 of Brown Thrasher, 6 of Summer Yellowbird, and 5 of Orchard Oriole. I have an egg of the Purple Grackle, the color of which is a dull ashy-white with a few markings at the larger end, and is covered with pimples. A. B. ROBERTS, Weymouth, Ohio.

The following is a list of bird arrivals in this locality, continued from last issue:

April 20th.—American Goldfinch.

April 30th.—While out hunting with a friend, we secured a pair of Blue-wing Teal. These birds are quite a rarity here at this time of year. They were stuffed by ye editor. Spotted Sandpiper seen.

May 5th.—Snipe, Red-and-white-shouldered Blackbirds.

May 6th.—Wood Thrush, Baltimore Oriole, Whip-poor-will, Woodcock.

May 7th.—Wilson's Thrush, Night-hawk.

May 8th.—Bobolink.

Mr. M. Cook, Brockport's taxidermist, reports the shooting of a Sandhill crane, on Sandy Creek, near this place, on May 20th. Mr. Cook has the bird and pronounces it to be an extra large and fine specimen.

While "sugaring" in the fall of 1884 we captured a large specimen of *Erebus Odora*, a moth quite rare in this locality.

CHAS. P. GUELF, Brockport, N. Y.

More than half of our birds have already arrived, and the northward movement will be ended by the last of May. The following is a list of the birds ob-

served at this station up to date. The first date is when first bird was seen, the second when the species became common.

Shore Lark, Feb. 22—Feb. 22.
 Robin, March 19—March 26.
 Bluebird, March 19—March 24.
 Black Snowbird, March 20—March 26.
 Red-tailed Hawk, March 20.
 Marsh Hawk, March 25.
 Meadow Lark, March 26—April 6.
 White-rumped Shrike, March 26—do 28.
 Duck Hawk, March 27.
 Swallow-tailed Kite, March 27.
 Yellow-shafted Flicker, March 31—Apr 19
 Cooper's Hawk, April 2.
 Common Pewee, April 2—April 8.
 Mourning Dove, April 4—April 11.
 Bronzed Grackle, April 8—April 9.
 Spotted Sandpiper, April 3—April 4.
 Killdeer Plover, April 4.
 Rough-legged Hawk, April 4.
 Blue-winged Teal, April 8.
 Wood Duck, April 8.
 Purple Finch, April 9.
 Red-&-buff-sh'ld Bl'kbird, Apr. 9—do 15
 White-crowned Sparrow, April 9.
 Kingfisher, April 10.
 Chipping Sparrow, April 10—April 12.
 Passenger Pigeon, April 11.
 Russet-backed Thrush, April 11.
 Wood Thrush, April 11—April 20.
 Purple Martin, April 13—April 14.
 Herring Gull, April 14.
 Thick-billed Grebe, April 15—do 16.
 Chewink, April 17.
 Purple Grackle, April 17.
 Cowbird, April 17—April 20.
 American Coot, April 20.
 Brown Thrush, April 24—April 29.

Where a space is left vacant in the column of common dates, it is either meant that the bird is not common or that it does not remain here to breed.

G. H. SELOVER,

April 29. Lake City, Minn.

Thinking that it might be of interest to the readers of the Companion, I submit below a list of the arrivals taken to date, for the Department of Economic Ornithology, under Prof. Reily, Dept. of Ag., Washington.

Feb. 14th.—Yellow-shafted Flicker, flock of 8; Red-headed Woodpecker.

Feb. 19th.—Purple Grackle.

March 11th.—American Robin.

March 15th.—Red-and-buff-shouldered Blackbird.

April 1st.—Chipping Sparrow, Spotted Sandpiper.

April 10th.—Mourning Dove.

April 11th.—Pewee, Wood Pewee, Killdeer, Belted Kingfisher, Little Blue Heron.

April 18th.—Brown Thrasher, Black-throat Bunting, Red-eyed Vireo, Chewink, Turkey Buzzard.

April 20th.—Barn Swallow.

April 22nd.—White-throat Sparrow.

April 23rd.—American Goldfinch.

April 25th.—Bank Swallow, Chimney Swift, Cedarbird.

April 29th.—Baltimore Oriole.

April 30th.—House Wren.

May 2nd.—White-bellied Swallow.

May 4th.—Maryland Yellow-throat, Catbird.

May 5th.—Kingbird.

The Black Snowbird departed for the North on April 11th, and the Tree Sparrow on the 25th. Should like to hear from others who have taken observations in south-east Pennsylvania.

WARREN CARTER, Wallingford, Pa.

It was our intention to have two more illustrated articles in this number, one on entomology and the other on archaeology, but we could not get the cuts in time. We have one illustrated article, however. No. 12 will be illustrated.

A Naturalist Canoeing 200 Miles in the Adirondacks.

BY FALCON.

CHAPTER XI.

Next morning, being Sunday, we kept late hours and did not have breakfast until 10 o'clock. After a thorough perusal of that useful meal we started in the canoes for a tour of inspection around the lake. Follingsby's Pond is three miles long, and is the least visited of any of the lakes we paddled on. It used to be a favorite resort of Agassiz, Lowell and other eminent literary men, who had a shanty here. In the evening, just before dusk, the Professor and myself set to work to have a good fire. The shore for a long distance was covered with light, fine driftwood. Of this we collected about two cords and made a pile six feet high, in front of the tent. A match was applied and the whole pile blazed away, lighting up the beach for a great ways. But in a short time it began to grow hotter and hotter, and the tent was in danger of catching fire, so we were obliged to move it before going to sleep. Monday being our last day on the water, we were up bright and early and succeeded in making better time through Follingsby's Brook than in coming up. Paddling up the Raquet River, we reached Raquet Falls about noon, around which we carried the canvass boats. The falls are simply very steep rapids. The river falls here fifty feet in three-quarters of a mile. We put in again above the falls and paddled ahead for Long Lake, which we reached at sunset. We put up the tent on the remains of an old military road, which was used between Albany and Inebec during the French and In-

dian war. The remains of a bridge over Raquet River is still visible. Next day, as we had but fourteen miles to go, we took our time, stopping at the shanty for dinner. Night found us at the hotel at the head of the lake, where we stopped for the night. Next day, after a tiresome jaunt over the road we came in on, we reached Schnecktady, and the next day brought us home, looking as brown as Indians and with appetites which threatened to swamp the family. Thus ended my first canoe trip in the Adirondack wilderness.

THE END.

To Advertisers.

Next month (June) we intend to issue a special edition of 5,000 copies of the COMPANION, nearly 2,000 copies of which will be sent to foreign countries. We are positive it will pay you better to give us an advertisement for that issue than were your money invested in any other way. Try it and be convinced. The rates will remain the same as heretofore; see first advertisement page, this issue.

To Whom it may Concern.

With this number we commence filling the subscription list of the late "Young Ornithologist" of Boston, Mass. We hope the change will prove satisfactory to all concerned.

SUBSCRIBE NOW!!!

We have a very capacious waste-basket, and parties wishing to help fill it need only to write us a letter and ask for a reply without enclosing the necessary stamps. To save trouble, label letter "waste-basket contribution."

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We request all of our readers to send us a description of their
Collecting Excursions, their Finds, or any items they may think
will be of interest to the readers of the COMPANION.

CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

ASSOCIATE EDITOR,

H. F. Thompson, Indianapolis, Ind.

RANDOM NOTES.

We have received from J. E. Jones, St. Johnsbury, Vt., a fine specimen of copper ore, for which he has our thanks.

We will print your name, address and business on 100 good envelopes and send post-paid for only 40 cents silver.

A. N. Fuller, Lawrence, Kan., has our thanks for a number of specimens of woods, also pressed sea mosses.

We can now supply our readers with all the back numbers of this paper, excepting No. 1, at five cents each.

We have recently received from R. T. James, of Vernon Hill, Va., one of his famous "mad-stones."

Publishers will please mail copies of their papers to our associate editor, Mr. Harry F. Thompson, of Indianapolis, Indiana.

We will send 100 sheets of unruled writing paper (blocked) post-paid for 25 cents. Just the thing for business men and collectors to make notes on.

H. H. Tammen, Denver, Colorado, has our thanks for a copy of his "Objects of Interest from the Plains and Rocky Mountains." Price, ten cents.

We have received from J. C. Cahoon, of Taunton, Mass., a fine assortment of beautiful bird skins. Those in want of first-class skins and eggs should send for his illustrated catalogue. His prices are way down.

The NATURALISTS' COMPANION and the Collectors' Science Monthly, a large magazine devoted to philately, numismatics and general natural history, both one year for only 60 cents. The price of the Monthly alone is 75 cents.

With this issue we have the pleasure to announce to our many friends that the prospects which we made known in the article on Archæological Journalism in the April number are no longer a saying, but a fact. The NATURALISTS' COMPANION will, in the future, we are safe in saying, give to the young as well as the old archæologist the best articles that can be procured; and further that there are numbered among our contributors some of the foremost scientists of to-day, besides many collectors and amateur archæologists. Subscribe and watch and prove what we are saying is true.

Mount Etna is in a state of eruption. Shocks of earthquakes are also reported in the vicinity of the mountain.

Parties in want of eggs and skins at low prices should patronize R. E. Rachford & Son. See advertisement.

Professor Elliot, of New York City, has been conducting some interesting experiments to test the sensibility or insensibility of insects to pain. A dragonfly was fastened to a board and its abdomen severed from the rest of its body. The latter was then fed to the insect by piecemeal, which it ate with evident relish, the parts eaten of course falling out of the severed end. Having eaten its own abdomen, it was served with six spiders and sixty flies, swallowing them all and losing them immediately, evidently suffering no pain.

We are obliged to write an opinion on an article from the pen of Mr. Wigglesworth, which appeared in the May issue of the Exchanger's Monthly. In speaking of a "rotten material" found over skeletons in a West Virginia mound Mr. Wigglesworth is of the opinion that this "rotten material" was once a tent and that the bodies were buried under it and then earth thrown over it, and that owing to the weight of the earth on the tent it fell in and thus made the depression which was found in the top of the mound. Mr. W. further states that this theory may also apply to similar depressions found in mounds near their crest. Here we disagree. The "rotten material" we believe was a blanket thrown over the dead bodies. We cannot recall any theory ever advanced as to the construction of mounds over tents. Many mounds were built by dumping baskets of earth, one upon and at the side of the other. Yet Mr. W. may be right and we may be wrong.

Davie's New Egg Check List.

Through the kindness of Professor Davie, we have recently received a copy of his valuable work, "Key to the Nests and Eggs of North American Birds." The work consists of 184 pages and contains seven full-page engravings. It gives a full and accurate description of the nests and eggs of all birds known to breed in North America. So minute are the descriptions that it seems possible for any person, with the aid of this book, to identify eggs equally as well as a veteran oologist. To show the completeness of the work, we quote the following description of the Purple Grackle:

278. Purple Grackle—*QUISCALUS PURPUREUS*. Light greenish-white, with large dashes and irregular streaks of black and brown, in some chiefly at the larger end; in others the ground-color is of a rusty brown; these are marked chiefly about the larger end with cloudy blotches of the same color; four to six in number; average size about 1.25 by .90, varying greatly in color and size. The Crow Blackbird places its nest in trees at any height, and it prefers conifers or other thick foliated kinds; generally on boughs, but sometimes in a hollow, quite often in hollow stubs, in low trees near water, and even in bushes. The nest is loose and bulky, of twigs, hay, grasses, and mud is frequently used. Breeds throughout its range. Habitat, Atlantic coast of United States.

We will send this book post-paid and one year's subscription to this magazine on receipt of a one dollar bill.

Readers, we would like a few more ornithological articles. We have plenty on mineralogy.

The Bruce Collection.

Upon invitation of Mr. David Bruce, Brockport's prominent naturalist, we recently made him a call, with the object in view of examining his immense collection. After listening to numerous tales of adventures which befell him while collecting in the West, we were shown his collection of North American moths, which, with but a few exceptions, is complete. He had the collection arranged in a handsome cabinet with glass doors. The cabinet contained in all about fifty drawers, in which the specimens were scientifically arranged. The bottom of each drawer contained a layer of cork, over which was spread a sheet of canvass the exact size of the interior of the drawer, and then the canvass given a thick coat of arsenic. This, Mr. Bruce informed us, is a positive protection against the ravages of insects. Mr. Bruce has an excellent method for arranging his specimens. He cut three pieces of red tape the exact length of the drawer, and then attached the ends of these at the front and back of the drawer, at equal distances apart, and one inch from the bottom of the same. These were intended to divide the drawer into four rows or columns. After properly arranging the insects, he wrote the name of each variety on slips of paper, which he pinned as a dividing mark between the different species; on the back of each drawer was then printed the name of the family to which the insects contained therein belonged. On the whole the collection looked magnificent and far beyond our most highest expectations. Mr. B. claims to have the largest private collection of lepidoptera in the United States, outside the city of New York.

His collection of butterflies were nicely arranged in spool cabinets and looked quite as well as did the moths. In one corner of his room stood a mammoth breeding cage, the floor and sides of which were nearly covered with cocoons. We were also shown a large collection of mounted and unmounted bird skins, and a collection of the wild flowers of Western New York. Mr. Bruce has made a number of collecting trips in the West. Last year he brought home, among other things, 1,000 bird skins. He left Brockport the forepart of this month (May) for another sojourn in the wild West, where he intends remaining until about the first of September. Among other places, he will visit Montana, Dakota and California, and no doubt he will return well laden with many rare and valuable specimens.

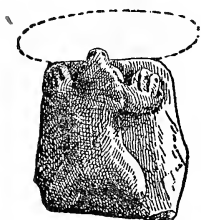
Our Prizes.

In order to increase the already large circulation of the COMPANION, we make the following offer: For the first subscription received by us AFTER June 20 we will present that subscriber with a nicely mounted bird; for the second subscription, a fine bird skin; for the third, one crow's egg. The above will be forwarded post-paid.

Mr. N. S. Goss, Topeka, Kansas, has kindly presented us with a copy of his "Birds of Kansas," a neat little book of 76 pages bound in cloth. The book contains a description of the nests and eggs of all birds known to breed in Kansas. Mr. G. has our thanks for the same. The book makes a valuable addition to our library. Our Kansas friends should procure a copy of the work, as it will aid them greatly in identifying eggs.

A Rain-God in Clay.

BY EDWIN A. BARBER.



Nothing can be more gratifying to a collector than the occasional discovery of a rare or antique specimen which must enhance the value of his cabinet in his own, and the eyes of his brother enthusiasts.

One evening, in the summer of 1875, after camp had been struck and the pack animals unloaded, I sallied forth amongst the ancient ruins in South-eastern Utah, in quest of relics of a long-departed people. Amongst the dwarfed sage-bush and the crumbling mounds which mark the sites of former stone houses, I found many a fragment of curiously painted pottery, scores of beautiful arrow-tips of pink, agatized wood and of black, translucent obsidian, portions of oddly shaped implements of jasper and numberless other objects which would gladden the heart of the most venerable archæologist. Every collector of any experience knows how rapidly time flies when he is engaged in such fascinating pursuits. Loaded down with relics, I suddenly became aware that the sun had set behind the western canons; it was rapidly growing dark and I was far from camp and the supper which was awaiting me. A little to the right, however, I see a ruin somewhat larger than any I have thus far explored, and in the gathering dusk I

determine to take one more hasty look before turning back. Here, amongst thousands of pieces of broken vessels, I find, half imbedded in the dust of centuries, a little fragment of rough pottery, scarcely more than an inch square, yet I see at a glance that it is no ordinary piece, but something quite different than anything I have thus far met with in my explorations. It proves to be the half of a narrow-mouthed vessel, on which is moulded, in bold relief, the miniature figure of a frog. Though rudely executed, it is lifelike and spirited, and is represented in the attitude of climbing the side of the jar and peeping over the rim. Moulded decorations are exceedingly rare on the oldest Pueblo ware and but few examples have been discovered. The frog, we have reasons for believing, figured in the ancient Pueblo religion as one of the lesser divinities of water, even as it is to-day venerated by the Moqui Indians of Arizona. Throughout this section of the Southwest rain seldom falls and water, which is exceedingly scarce, is valued highly.

Hastily returning to camp, where I found my companions impatiently awaiting me, I carefully packed my treasures with the valuable collection I had already gathered together, for transportation on mule back across the Rocky Mountains. The specimen which I have described, and which is here figured, may now be seen in the archæological collection of the Academy of Natural Sciences of Philadelphia.

There is no collection so attractive or interesting as a collection of bird skins.

Sunny South Oologist has discontinued publication.

With next issue we will have been your companion one year.

Historical Geology.**A SERIAL.**

BY FRANKLIN C. JOHNSON.

The fossils of the Post-Tertiary Period are many. The quadrupeds take the lead. We shall describe a few of them.

The Mammoth was a gigantic species of elephant. Its body, unlike that of the modern elephant, was covered with hair.

The Mastodon was much like the modern elephant. When full grown it was twelve or more feet in height. A farmer, while digging in a bog, in Warren County, N. J., found six skeletons. In the ribs of one was found parts of its undigested food.

The Megatherium was a huge sloth, much larger than the largest existing rhinoceros. Its fore feet were three feet long and a foot broad. Its tail was two feet in diameter. There is a skeleton of one in the British Museum which is eighteen feet long.

The Glyptodon was clad in a shell, like that of the turtle. It was nine feet or more in length.

The Cave-Bear was common. They often grew to the height of six feet and to the length of ten feet.

The Hyena was plentiful in Europe.

The Irish Elk had antlers which often had a spread of three yards, from tip to tip.

CHAPTER VIII.**MAN.**

Man probably appeared during the Champlain Period.

We find his bones and his rude stone implements side by side with the bones of the Mammoth, Cave-bear, etc:

The time of ancient man has been divided as follows:

- | | |
|---------------|--|
| 1. STONE AGE. | 1. Epoch Extinct Animals
2. Reindeer Epoch.
3. Polished Stone Epoch. |
| 2. METAL AGE. | 1. Bronze Epoch.
2. Iron Epoch. |

THE STONE AGE.**EPOCH OF EXTINCT ANIMALS.**

Man built himself no houses during this epoch, but lived in caves. He made rude weapons of stone, with which he fought the savage Cave-bear, and hunted the Irish Elk and other animals.

REINDEER EPOCH.

Man was slowly advancing. He made his weapons better. He also learned to use the bones and tusks of the animals he killed, by making implements of bone and ivory. He learned also to draw, in a rude way, upon bone and ivory, the outlines of the animals he hunted.

POLISHED STONE EPOCH.

Man was now more civilized. He made boats and ventured out on the sea or paddled around on the rivers and lakes. He raised a few vegetables and grains.

THE METAL AGE.**BRONZE EPOCH.**

Man made a great stride toward civilization. His weapons and tools are much better. The horse, sheep, goat and other animals are domesticated. He raises grain, etc., and stores it for winter use.

IRON EPOCH.

When man discovered iron he made another stride toward civilization, for what could he not do with iron? From this time on, man rapidly advanced in civilization.

CONCLUSION.

We have, in the previous pages of this article, passed through all the grand stages of this world's history. When we look back, we ask ourselves: "Did geology cease with the coming of man? Will man yet vanish from the earth as did the mammoth and the mastodon, and will a superior being take his place?"

Many of our modern animals, such as the buffalo and the beaver, will soon be extinct. The mud of our day will be the rocks of another. Changes are continually going on around us. But will man become extinct? We think not. The earth was made for man. The Creator had man in view when the first rock was formed; the coal and metals were stored in the earth for him, and all the great changes of the earth were to prepare it for him. Man in his every movement shows forth the divine inner being. He can make a fire; he can produce his thoughts in words, or write them on paper; he brings the elements to his aid, heat light, electricity steam and water, all are used by him.

THE END.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

OSCAR QUEAR, Arcadia, Ind.—Indian relics, rare minearls, old coins, Vols. 1 and 2 Golden Days, for curiosities from other states.

L. H. McNEILL, Mobile, Ala.—Coins, stamps, birds' eggs, etc., for U. S. cop-pers earlier than 1830.

A. B. ROBERTS, Weymouth, Ohio.—A fine fossil clam for every two perfect

arrowheads; ten numbers Young Oolog-ist for Indian relics.

COLLECTOR, 305 French St., Wilming-ton, Del.—Stuffed birds and other curi-os in exchange for perfect arrowheads and other Indian relics.

GLENN STEARNS, Circleville, Tex.—Will exchange scorpions, two varieties quartz, petrified oak wood, and other minerals; also birds' eggs, for Nos. 1, 2, 3 and 5 of this paper.

HARRY DANIELS, St. Johnsbury, Vt.—A good starfish for every three sea beans; a Chinese coin for every good moss agate; a pair of Chinese chopsticks for a 3x3 piece of crystalized gypsum.

D. M. GROSH, box 877, Shamokin, Penn.—Fossil ferns on slate, peacock coal, crystals, sulphur and water dia-monds, for minerals, relics, curios, shells, and stamps.

W. M. SACKETT, Meadville, Penn.—My collection of unclassified hymenop-tera for lepidoptera and coleoptera, also lepidoptera and coleoptera for same. Correspondence desired with Southern and Western collectors.

R. M. JESTER, Sheffield, Ia.—15 for-eign stamps for every good labeled min-eral, arrowhead, minnie ball, or ocean curiosity. Fine specimens of pressed flowers and ferns (mounted), for miner-als, shells, Indian relics, etc.

ARTHUR NEVILL, Breslau, N. Y.—23 miscellaneous papers, 32 boys' papers, 36 naturalists' papers, 40 stamp papers, 3 fossil shells, pudding stone, 32 old U. S. post-cards, 2 Canada post-cards, 20 numbers Harper's Bazar, 11 of Popular Science monthly, stuffed meadow lark, and "The Dog Crusoe," for coins or offers.

G. D. STORY, Carterville, Mo.—Nice bound books and ones in paper covers, of all kinds, for others on mineralogy, geology, archæology and natural history.

C. S. MASON, Easton, Penn.—I have fine specimens of zinc blende, calamine, iron pyrite, calcite, quartz, grenochite, goethite, kaoline, limonite, geodes, mica, fibrous asbestos and red granite in exchange for good specimens of minerals.

D. H. EATON, Woburn, Mass.—I want copies of many stamp and natural history papers to complete files. Send a list of what papers (name, Vol. and number) you have and what you want. I want No. 1, Vol. 1, of the NATURALISTS' COMPANION. I have fine horse-shoe crabs, starfish, shells, fossils, minerals, woods, etc., to exchange.

25 foreign stamps for every special delivery stamp; a three-jointed telescope for best offer of U. S. stamps, except current 1 and 2 cent; a recipe for an ink and pad that takes 150 to 200 copies from one writing and cost \$5.00, for best offer of U. S. entire, used or unused, envelopes. Postmarks for stamps or philatelic papers. S. M. SAVIDGE, L. box 472, Pottstown, Penn.

QUERIES AND ANSWERS.

G. D. S., Carterville, Mo.—We identify specimens free of charge to subscribers; all others 5 cts. per specimen.

W. S. S., Richmond, Kan.—We have all the eggs mentioned in stock. Do not wish to exchange books.

A. B. R., Weymouth, Ohio.—Minerals sent for identification are as follows: No. 1, flint; No. 2, iron pyrites and flint; No. 3, chalk.

G. S., Circleville, Tex.—Both specimens sent are varieties of calcite. Will endeavor to answer other questions in next issue.

E. R. O., Danbury, Iowa.—The eggs described are undoubtedly those of the Red-shouldered Hawk. The set is valued at \$1.80.

One house recently uncovered at Pompeii appeared to have been undergoing repair at the time it was overtaken by the terrible volcano storm of November 23, A. D. 79. Painters' pots and brushes and workman's tools were scattered around, and spots of whitewash starred wall and floor. Pots and kettles had been bundled up in a corner by themselves, but dinner had not been forgotten. A solitary pot stood on the stove. The oven was filled with loaves of bread, and a suckling pig was awaiting on a brown dish its turn to be baked. But the pig never entered the oven, and the bread remained in it eighteen centuries. Monsieur Florelli's museum at Pompeii contains the loaves—twenty-one in number—rather hard and black, but perfectly preserved.

TO OUR SUBSCRIBERS:—As we shall issue 5,000 copies of this paper next month, it may be that we shall be delayed in getting the paper out on time, if so our readers will know the cause, and not think that we have failed. If we are behind at all it will be but a few days. That number will be the finest ever issued, both in articles and illustrations.

Parties in want of first-class Job Printing at very low prices should write us and get our lowest terms. It will pay you much better to let us have your work than to send it elsewhere.

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1 of our Catalogues.	2 cents

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Valparaiso, Ind.

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The Naturalists' Companion.

"Whosoever the Naturalist turns his eye, life or the germ of life lies spread before him."--Humboldt.

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CHARLES P. GUELF,
EDITOR AND PUBLISHER.

Single Copy,
5 Cents.

VOL. I.

BROCKPORT, N. Y., JUNE, 1886.

NO. 12.

Egg Collecting.

BY W. G. ROBERTS, SAN LEANDRO, CAL.

Is egg collecting cruel? Many persons say it is, but I think I can prove to the contrary. The housewife knows that a hen is devoid of the faculty of counting, and is generally as content with one egg as a dozen, and will even sit on a china egg. The same case applies to birds, and if one or two eggs are left in the nest, the one already taken will be replaced. Notwithstanding, if sufficient care is not taken, the branches around the nest will be disturbed, and thus the bird will be led to desert it. But this evil is easily remedied, if the collector will be careful and always replace the branches as they were formerly. I assume that none of our readers are cruel enough to rob a bird of all of its eggs; in this case egg collecting, instead of being an interesting and instructive hobby, becomes a cruel and wanton sport. Another thing to be remembered is that an egg should never be taken from a nest without first ascertaining its advancement in incubation; this may be done by holding the egg before the light, and if the yolk is of a dark, sluggish color you may safely take it for granted that a young bird will shortly issue from it,—therefore leave it alone.

There are many articles needed by

the young oologist. First, something will be required for the reception of your eggs. A cabinet may be bought for a fairly low price; but all that is required by the beginner is a nicely planed box, about two inches in depth and divided into partitions by stout strips of pasteboard. Each partition, which is about one inch square, is filled with cotton and an egg placed in each. Eggs are also sometimes gummed on to slips of cardboard which are made to fit in each partition.

Though an egg may be blown with no other apparatus than a pin and the mouth, yet of course a blowpipe and drill are much handier, and the hole made is much neater, and the process much shorter; it will also be safe to remember that without an egg is blown with one smooth hole in the side, it has no market value. A brass blowpipe costs 15 cents, and drills 10 to 50 cents, according to the size; of the latter you will need three different sizes, viz., one of the smallest size drills, a 3-32 inch drill, and a 8-32 inch, for the drilling of large eggs, such as crow's and gull's. To blow eggs, hold the hole that you have previously drilled, downwards, and with your blowpipe blow therein. When the contents have been emptied, inject water in it, so as to cleanse and remove any remnant that may remain. Corrosive sublimate is generally used for cleansing, but as it is excessively poisonous I would

not recommend it. It is often very difficult to blow humming-birds' eggs, the shell being so fragile and susceptible to break. This difficulty may be surmounted by painting the egg with a strong solution of gum arabic and water, which must then be left to dry on the egg; you will be surprised to see how much this strengthens an egg. To brighten eggs, rub a little of the white of the egg on them.

A pair of climbers will be found almost indispensable; they range in price from one to three dollars.

Always have a little note book in which you write name of bird from which each egg in your collection is taken, also size of egg, when and where found, name of collector finding it, also any remarks about nests or peculiarities about eggs. You have thus an interesting account about each egg that is in your collection.

I have noticed a very simple but effective method for measuring eggs. I take it, as it is, from an ancient number of one of our amateur papers.

"Take a small board (four inches square will be sufficient), draw a line across the centre and at even distances from the line place pins or pegs, as shown in the diagram.

.	— $1\frac{1}{8}$; 1.12
.	—1; 1.
.	— $\frac{7}{8}$; .87
.	— $\frac{3}{4}$; .75
.	— $\frac{2}{3}$; .62
.	— $\frac{1}{2}$; .50
.	— $\frac{3}{8}$; .37
.	— $\frac{1}{4}$; .25

To measure, place your egg length-

wise upon the centre of this and run it along until the ends come in contact with the pins; the figures at the pins which are touched give the width of the egg. Then repeat with the egg sidewise which will give the length."

One more final hint and I will be done. Always keep your cabinet in first-class order, and blowing utensils clean and bright.

To Our Readers.

With this number we have completed the first volume of the NATURALISTS' COMPANION. It has been our aim to make this magazine worthy the support and patronage of every naturalist in this broad land, and it has also been our aim to give our readers their money's worth of good reading and to aid them in their studies of the grand works of Nature. We did not venture the publication of our magazine in the view of a money-making, scheme but with a view to educate ourself and add to our knowledge of natural history. We have succeeded far beyond our expectations, both financially and otherwise, and, by the many flattering compliments bestowed on us by our readers, we feel that they too are highly pleased with the magazine. If one wishes to note the advancement which our magazine has made during the past year, let him lay side by side No. 1 and No. 12. Is there not a vast difference?

During the year just past, many new papers on natural sciences have appeared, and lo! how many have vanished? When we note these occurrences we feel heartily thankful that we have so safely passed through our first voyage on that perilous sea of journalism,

and we cannot help but lament the fate of our less fortunate brethren who sank amid its stormy billows. Now that we have succeeded so famously on our first voyage, we feel amply strong enough to endure the trials and hardships of another journey, and we sincerely hope that all our readers will embark with us again.

Among the many contributors secured for the coming year, we mention the following gentlemen: W. R. Lighton, W. G. Talmadge, Harry F. Thompson, George H. Berry, Warren K. Moorehead, Prof. Edwin A. Barber, Prof. Chas. N. Bell, and W. S. Beekman.

A great many subscriptions expire with this number and we hope that our readers will all see fit to favor us with a prompt renewal. The subscription price will remain the same as heretofore, 35 cents. Wishing our readers unbounded success, especially in their natural history studies, I remain, Yours for science,

CHARLES P. GUELF.

The Great Mineral Region of Jasper County.

G. B. STORY. CARTERVILLE, MO.

Jasper County produces more zinc and lead than any other county in the United States, besides many other minerals. The iron pyrites found here are the most beautiful in the country. Jasper County is situated in the southwestern part of Missouri, bordering on the Kansas line. Here in Carterville, the centre of the mining region, are enormous mines, also at Webb City, Granby, Carl Junction, Galena, Joplin and many other places. The ore

is found all the way from the surface down, so far not over 250 feet deep, as they are working out the top run; after a while, as it is worked out, they will go deeper. The lead is on top and the zinc is underneath. The way the mines were discovered was by a man plowing the lead up in the grass roots. Some men at work in the mines at this place found a live frog in the solid rock fifty feet deep. There are three large caves in this place, where you can go down into the mines at any place. There are many evidences of the earthquake of 1812 around here. On the river, about two miles from here, there is a ledge of rock about five miles long, part of it on one side of the river and part on the other, and in some places 200 feet high, which is a perfect labyrinth of caves, which are all connected together. The largest one is about fifty feet square at the mouth, and gradually slopes in for about 200 feet, where it gets so small that a man can go no farther, although foxes go in and out of the whole ledge. Last winter some hunters built a fire at the mouth of one of the caves to smoke out a fox, and in about five minutes the animal came out of a round hole about 500 yards back in the woods, where the smoke was rolling out. The country back of the ledge is full of holes which are connected with the caves. About five miles back on the prairie is a large hole about twenty-five feet deep and fifty feet across, with a small hole at the bottom. Hunters very often run foxes in to it, but so far as I know no one has explored it. Some boys and myself are talking of doing so; if we do I will tell you all I can learn about the place.

Sandstone Houses.

BY G. H. SELOVER, LAKE CITY, MINN.

A few days ago I happened to notice, on my way to St. Paul, a number of small holes in the sandstone cliffs, a mile or so east of the city. On returning, I thought I would investigate somewhat, and found that they were not produced by any natural cause, but artificially, as it were, by the various kinds of swallows. Very few of these "cliff houses" were in reach, as these cliffs are from sixty to eighty feet high, and the holes were all within twenty feet of the top. Those in reach from the top proved to contain young of the Cliff, Bank, and Rough-winged Swallows. Very few, on account of the advanced time of year, contained eggs, and these were all nearly hatched. The holes were made in the stone by the birds as nesting places, and were between ten and thirty inches in depth by from one and a half to three inches in diameter.

Will some one who is more conversant with the habits of these species than myself, please let me know whether this is a usual occurrence? As for myself, I have often seen Bank and Rough-winged Swallows burrowing in to the soft clay banks but never before into hard sandstone.

Limestone.

Read at the first annual meeting of Chapter 760 of the Agassiz Association, Jamaica Plain, Mass.

There is scarcely a family of minerals, excepting the quartz, that furnish so many specimens to the collector or mineralogist as limestone. What collection would be complete without

specimens of Iceland spar, satin spar, calcareous tufa, and stalactites, which when polished are often more beautiful than agates. If all the fossils composed of calcite were to be annihilated, the geologist would lose many of his most interesting specimens. He would lose almost every fossil shell and shellfish and many fossil plants and leaves.

Limestone is of great interest to others besides those who look upon minerals as something to be collected in vacation to be placed in cabinets, or those who look upon them from a scientific point of view. For the fine arts it is used almost universally, being employed in almost every case for sculpturing and ornamental work. It is of great value as a building stone, some varieties even surpassing granite for durability.

This important family comprises one-seventh of the earth's crust. It includes all minerals that are composed of calcite or carbonate of lime: that is, carbonic acid united with lime. Among the most important varieties of this family are many kinds of marble, Iceland spar, satin spar, chalk, stalactites and stalagmites.

Calcite, which is the scientific name for all limestones, crystalizes in the hexagonal system. The crystals are usually in hexagonal prisms or rhombohedrons. Iceland spar is an example of a rhombohedron. It may be granular as in marble, or it may be compact. The cleavage is rhombohedral. The lustre is vitreous. The streak is white.

The colors are white or light grayish or yellowish, and some of the massive varieties are black. If some calcite be placed in a test tube and a little hydrochloric acid be poured upon it, it will seem to boil, which is caused

by the hydrochloric acid uniting with the lime in the calcite, freeing the carbonic acid, which escapes in bubbles. This is called effervescence. As calcite is the only mineral that effervesces freely with cold dilute hydrochloric acid, it is very easy to distinguish.

Calcite is so slightly dissolved by water that it is tasteless. Fifteen hundred parts of water are required to dissolve one of calcite. Water containing carbonic acid dissolves calcite much more readily. This is noticeable in the formation of caves in limestone, which are formed by the limestone being dissolved by water containing carbonic acid.

If calcite be kept at a red heat for several hours, the carbonic acid is driven out and pure lime is left. The stone will be half as heavy as originally. Limestone that has been treated in this manner is called quicklime. If tested with hydrochloric acid in the same manner as the calcite was, it will not effervesce. This is because there is no carbonic acid in the mineral to escape.

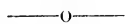
The commonest method of burning lime in a lime kiln, is to build a furnace, either round or square, with an opening at the base to manage the fire. At first large pieces of limestone are piled in the form of an arch, leaving a place for the fires, and then the stone is thrown in loosely over this arch. After the heat has driven out the carbonic acid, the fires are put out and the quick lime is taken out.

If water be added to the quick lime, it will swell, burst into a powder, and grow hot, and although water has been added it is still quite dry. The water has united with the lime, forming slaked lime. If quick lime is exposed to

the air, it takes up moisture and becomes air-slaked. If the quick lime is slaked with enough water it forms white-wash, which is very useful. On standing, part of the lime will settle, leaving pure lime water, which is a saturated solution of lime; that is, the water contains all the lime it can dissolve. One hundred parts of water will dissolve one of pure lime; and as fifteen hundred parts of water are required to dissolve one of calcite, pure lime is much more soluble. If a person blows into some lime water through a straw, the water will become cloudy, then milky, and finally some fine white powder will sink to the bottom of the glass. This is caused by the carbonic acid in the person's breath uniting with the lime in the water, forming carbonate of lime or calcite, which is not so easily dissolved as pure lime, therefore the water cannot contain as much calcite as pure lime, and the calcite is deposited as a fine powder.

TO BE CONTINUED.

In 3,000,000 years the mean annual temperature of the earth will have decreased thirty degrees, and eventually the terrestrial hemisphere will be frozen up, according to the latest astronomical computations. It makes one shiver to think of it.



High winds are sometimes a surprise to birds as well as to men and beasts. A long-legged sand hill crane was taking a nap by the side of a pond in the zoological garden in Philadelphia, when a mighty gust of wind struck him squarely and knocked him into the water. He came up dripping and when the crowd laughed he sneaked away to a lonely corner.

Giants Among Small Things.

BY CHAS. D. PENDELL, WAVERLY, N. Y.

Were we to write of the geological predecessors of the existing species, volumes would be required to produce anything like an adequate description. Two examples from the past, however, will be better than none and may induce the reader to delve more deeply into the mysteries of that fascinating science, Geology.

The lobster of the present era, as commonly seen, does not exceed five pounds in weight and is oftener less; though when arrived at full maturity their weight is about ten pounds. But going back countless ages to the early Devonian era, we behold what may truly be termed a prince of lobsters. This giant crustacean, which is called *Pterygotus*, attained the length of six feet and was two feet in breadth. Its antennæ were armed with powerful claws, and in many ways did it possess double advantage over its modern congener. It possessed two pair of eyes—a large pair on the front of its head and a smaller pair on the top. For perfect mastication it was provided with four pair of great serrated jaws. (Surely, it never became extinct through dyspepsia!) On each side was a powerful paddle, enabling it to swiftly pursue its prey; while if attacked by any predaceous superior, it could, by striking the water with its broad tail, retreat with the rapidity of an arrow.

The Triassic period furnishes another example in a species of frog, which sometimes attained a size fully equal to an ox. No complete remains of the *Labyrinthodon*, as it is called, have

been found; but enough to fully establish its character. The mouth was furnished with numerous rows of small but closely set teeth, and from this fact it derives its name.

Conchology is not supposed to be replete with gigantic specimens, but in the archipelago of the Molucca Islands, such specimens are by no means rare. Here the *Tridacna*, sometimes weighing five hundred pounds, fasten themselves to the rocks and can only be cut loose with an axe. Their thick shells, five feet long, are used by the natives as bath tubs, ready cut and polished by nature.

Another mollusc of prodigious size is the cuttle-fish. One seen near the Canary Islands had a spread of arms of twenty feet and weighed over four thousand pounds.

A variety of sponge known as Neptune's Cup, grows on the submarine rocks, from three to six feet high. Their small stock and wide top, symmetrically hollowed out, is an almost exact representation of a colossal drinking goblet.

The marvelous delicacy of organization and still more marvelous intelligence of insects has always been a cause of wonder and a source of admiration; and in this class also, we find extremes of strength and size. One species, the Goliath of Drury, is much larger than many kinds of our more common birds, which it would pitilessly strangle and devour, were it in his power to capture them. This entomological monster is, from the extremity of the abdomen to that of the mandible, four inches long and is one half as broad, and armed with its strong bony coat of mail, it well deserves its name. The *Mormolyce*, though meas-

uring three and one-fourth inches in length, is not a powerful insect and its source of protection lies in the resemblance of its green wings to the leaf of the plants among which it lives. The antennæ are nearly three inches long, making its extreme length about six inches.

A species of butterfly exists in South America, the body of which is as large as that of a robin and its velvet wings, ornamented with the most gaudy coloring, extend a foot across.

Many spiders of the tropical world have a body three inches long and the circle of their legs six inches in diameter; and one species on the Amazon is five inches long. Some of these giant spiders are extremely active and will attack small birds and strangle them in their nests. One species quite numerous in Columbia, some times fastens on the neck of chickens and pigeons, seizing them by the throat and killing them instantly. Others of these spiders obtain their prey by weaving webs so strong that large butterflies and small birds, even, become helpless victims. Though in the temperate zone spiders are of repulsive appearance, numbers of those of the tropical world are radiant with the shine and metallic lustre of many and varied colors.

In the botanical world the leaves and flowers of plants generally attract us by their symmetry and regularity of outline, or the beauty and harmony of their color, and their delicate but pleasant perfume. But if we transport ourselves again to the Amazon we find there the leaves of the *Victoria regia*, which display themselves on the surface like immense plains of verdure. These leaves are nearly circular and from eighteen to twenty-five

feet in circumference. The upper surface is of a uniform and beautiful green; thus, when seen from a distance, presenting the appearance of floating tables covered with velvet. The frame work of these leaves is so strong that a child can float on them; and they are nightly used as a cool resting place by the many aquatic birds of that region.

The leaf of the great talipot palm which grows in India is so large that under its vast cover forty persons can shelter themselves. The leaf of this tree is sometimes fixed to the ceiling of museums of natural history, one leaf covering it completely.

The flower of the remarkable *Victoria regia*, the leaf of which has been referred to, was long considered the largest in the world. These brilliant rose and white blossoms often measure a yard in circuit and emanate a pleasant fragrance.

But the flower of the gigantic *Rafflesia Arnoldi* is a perfect monster of vegetation and leaves all others far behind. On account of its mammoth proportions, botanists for a long time refused to believe the existence of such a flower, and it was not until a specimen was sent to London and there examined that all doubts were dissipated. The flower is composed of a fleshy mass weighing from twelve to fifteen pounds. "Its border, the circuit of which is not less than ten feet, shows five lobes, forming a gaping excavation capable of holding a dozen pints." Its odor is unpleasant having a carion-like smell. In Sumatra and Java where it is found, the natives almost make a divinity of it and clothe it with a supernatural power.

But while the ignorant savage of the mighty works of nature creates a divinity, the naturalist recognizes in them the manifestation of an omnipotent Creator, whose works and wonders are everywhere displayed to the observing mind.

How to Make a Skin.

During the short collecting season, it is not always practicable to stuff and mount birds, especially when on a collecting trip, as one generally wishes to spend as much time as possible to capturing specimens. We therefore give the following directions by which one can preserve the skins, and in the winter, when time is not so precious, they can readily be mounted. After skinning the bird, as directed on page 44, No. 3 of the COMPANION, the skin is arranged in its natural position. Draw the leg bones out till exposed, wind with cotton and draw them back into their proper position. Fill the skull and cavities of the eyes with cotton; draw out the wing bones and fasten them about an inch or two apart (or as near together as they were in the original bird); this makes the wings fall into their natural position when the bird is stuffed. Now take a thin layer of cotton and place it along the back of the bird (inside the skin) and under the string by which the wing bones are fastened. This done, take a piece of cotton and rub it between the hands until it tapers to a point at one end. Take the tapered end of the cotton and pass it up the throat of the bird and out of its beak; draw it up until the throat of the bird is filled out to its natural size. Now fill the body with more cotton, if necessary, and carefully sew up the opening. Take the bird by the beak and shake it slightly so as to loosen all plaster, etc., and to make the feathers fall into their natural position. Next draw the feet down their full length and tie them together. Cut off the cotton where it protrudes from the

beak and run a needle full of thread through the nostrils and tie it under the bill, thus holding it firmly together. Now draw the bird out to its natural length, place the wings, feet and head in position and arrange the feathers properly. Get a sheet of stiff paper (writing paper will answer) about four inches longer than the bird. Take the paper and roll it into a cylinder, fasten with two pins. The diameter of the cylinder should be the same as that of the bird before skinning. The filled skin will be larger. Drop the bird into the cylinder two or three times to shape it, and then put it in until the beak protrudes from the opening, arrange it with the forceps, and see that the wings are even and the feet in proper position. Leave it for twenty-four hours, then remove it and arrange any feathers that may have been misplaced and replace it in the cylinder and leave it until dry. When dry the head and neck will be perfectly stiff. In the next issue we will give directions for relaxing and mounting these skins.

Rev. W. M. Beauchany, Baldwinsville, N. Y., has our sincere thanks for a copy of his excellent work on the land and fresh water shells of Onondaga County, N. Y., with a supplementary list of New York species. Price, 10c.

The coast of Alaska possesses a remarkable ichthyological curiosity in a candle fish. It is about eight inches long, transparent and very pure white fat. The Indians dry this fish, and then light it at the tail. It burns with a clear sparkling flame which a wind cannot extinguish. The fish will burn for a number of hours.

THE NATURALIST'S

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We request all of our readers to send us a description of their
Collecting Excursions, their Finds, or any items they may think
will be of interest to the readers of the COMPANION.

CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

ASSOCIATE EDITOR,

H. F. Thompson, Indianapolis, Ind.

RANDOM NOTES.

Hot! hotter!! hottest!!!

On account of issuing so large an
edition, this number is rather late.

Thompson & Co., of San Francisco,
Cal., have our thanks for a number of
Chinese curiosities, including chop-
sticks and coins. See advertisements.

We have just issued a price-list of
Indian and war relics and curiosities
for Mr. T. B. Stewart, Island, Penn.
The prices are very low.

Our friend, Mr. W. G. Talmadge,
Bristol, Conn., has gone into the elec-
tricity business, in which he is evident-
ly having good success.

Persons in want of first-class Job
Printing at rock-bottom prices should
send 1c. stamp for our reduced price-
list, just out. Twenty per cent. cheap-
er than other printers.

We send out a large number of sam-
ple copies this month, and should you
receive more than one, you will confer
a favor on the publisher by handing
the extras to your scientific friends.

Prof. Chas. N. Bell, of Manitoba,
Canada, recently read a length paper
on "Prehistoric Remains," before the
Royal Society of Canada. Prof. Bell
has favored the COMPANION with a
contribution on the archaeology of
Manitoba, for which he has our sincere
thanks.

We are receiving most hearty en-
couragement from archaeologists, and
we trust our readers will appreciate
the archaeological articles with which
we are presenting them. Editors will
please bear in mind that all such arti-
cles are written especially for the Com-
panion, and should not be copied with-
out our consent, and credit given also.

By the time this number reaches
you we will be encamped on the shores
of old Ontario, enjoying a hard-earned
vacation. On our return, we will write
up an account of our adventures while
in camp, which, we believe, will great-
ly please our readers. All communi-
cations intended for us only should be
addressed "personal," and they will
forwarded. All subscriptions and
communications should be addressed
as heretofore (address above) where
they will await our return.

J. Allen, Jr., Lake View, Ills., has our thanks for a file of his excellent magazine, *Young Naturalist's Journal*.

Read every advertisement in this issue and you will secure some magnificent bargains.

Our readers will please excuse us for devoting so much space to advertisements, it will not occur again.

We can now supply our readers with all the back numbers of this paper, excepting No. 1, at five cents each.

We will print your name, address and business on 100 good envelopes and send post-paid for 40 cents silver.

The finest natural history journal yet received is the *Ornithologist and Oologist*, Frank B. Webster, publisher, Boston. Price \$1.50.

Parties in want of first-class bird skins we would recommend them to Fred C. Lusk, a thriving taxidermist of Holley, N. Y. See advertisement.

We will send 100 sheets of unruled writing paper (blocked) post-paid for 25 cents. Just the thing for business men and collectors to make notes on.

We have just received a fine lot of bird skins of R. E. Rachford, Grigsby's Bluff, Texas, to whom we would recommend our taxidermy friends.

J. E. Jones, St. Johnsbury, Vt., will soon start on his regular collecting trip to the sea shore, and is prepared to fill orders for gull's eggs, sea weeds, mosses, shells, sword fish swords, and general curiosities.

The *NATURALIST'S COMPANION* and the *Collectors' Science Monthly*, a large magazine devoted to philately, numismatics and general natural history, both one year for 60 cents. The price of the *Monthly* alone is 75 cents.

The *Naturalist's World*, Percy Lund & Co., publishers, Ilkley, England, is by far the neatest and most interesting of any natural history journal received from a foreign country.

For only \$1.00 we will send Davie's famous *Egg Check List and Key to N. A. Birds*, describing the nests, eggs and breeding habits of every North American bird, and one years' subscription to the *COMPANION*. The regular price of the book alone is \$1.00.

In looking over a number of natural history papers recently, the prices ranging from 50 cents to a dollar, we find that our magazine contains more reading matter than any other American natural history journal priced less than one dollar.

The stingray is the natural enemy of San Francisco oysters, and his appearance on the Atlantic coast is almost as much to be dreaded as the five-fingered starfish that destroys the beds of eastern waters. The fish has a powerful pair of jaws, with which he considers it no trick whatever to smash the shell of an oyster into powder, after which he sucks the meat into his stomach and discards the rocky debris.

NEW SHARON, IA., June 14th, '86.

Dear Editor:—

I have perused the contents of No. 11, Vol. 1, carefully and have no hesitancy in saying I think you are at the front giving us the most information for the money of any paper I have taken or seen. My subscription runs out with the August number, I believe, but you can count on me for another term, sure. I am, as ever, one of the *COMPANION* family, R. D. GOSS.

We could print hundreds of testimonials like the above, had we space.

CORRESPONDENCE.

On May 26th, I took a set of four eggs of the Scissor-tailed Flycatcher, from a nest placed about six feet from the ground, and on June 10th I took another set of eggs from the same bird out of the same nest.

G. F. STEARNS, Circleville, Texas.

You asked in your paper for brief notes on birds. I have noticed the following birds, rare to Kansas, this spring: Am. Herring Gull, Black Tern, Willett and Scissor-tailed Flycatcher, also had given to me a very fine specimen of Osprey and Wilson's Phalarope, both shot in Kansas. I have had very good success collecting eggs this spring. F. M. WOODRUFF,

Topeka, Kansas.

Is not a nest of 37 eggs of the California Quail a large one? I collected a set of that size yesterday. I had seen several Quail in the field lately, and concluded to take a look for nests. After searching unsuccessfully along the fence, I started for the house, and when within fifty yards of it, I almost stepped upon two of the birds, and upon looking in a small wild rose bush I discovered the nest above mentioned. I, as well as others in this vicinity, are of the opinion that several Quail lay in the same nest. G. N. BEARD,

Upper Lake, Cal.

Davie quotes the number of eggs as from eight to twenty-four. As to more than one bird laying in the same nest, we think it rather doubtful. Would it not be a good plan for you to investigate the matter?—[ED.]

The following arrivals are among those noted:

Robin, February 23d.

Bluebird, February 24th.

Blackbird, March 2d.

Bobolink was noticed on May 17th and on the 23d, but probably arrived before that date; it is a rather uncommon species here.

The Great Blue and White Herons and the Brown Pelican and Sand-hill Crane are common. A Golden Eagle was shot upon the open prairie near Ottumwa in July, 1883. I do not believe mention was made of the fact at the time other than locally.

W. R. LIGHTON, Creston, Iowa.

Bird arrivals since last list:

Yellow-bellied Woodpecker, Ruby-crowned Kinglet, House Wren, April 9.

Winter Wren, Jack Snipe, Pectoral Sandpiper, Chewink, April 10.

White-throated Sparrows, April 15.

Wood Thrush, Yellow-rumped Warbler, Chipping Sparrow, Brown Thrush, April 16.

Bartram's Sandpiper, Am. Bittern, Carolina Rail, Virginia Rail, Sparrow Hawk, Swamp Song Sparrow, April 17.

Purple Martin, King Rail, April 18.

Red-headed Woodpecker, Savannah Sparrow, April 23.

Field Sparrow, April 24.

Black and White Creeper, Pine-creeping Warbler, April 26.

Ruby-throated Hummingbird, Apr. 28

Earn Swallow, April 29.

G. B. HOLMES, Fernwood, Ills.

It may be of interest to you and to the readers of the COMPANION to know that on June 2nd we obtained seven Roseate Spoonbill's eggs from one nest. This we believe to be the largest set of this bird's eggs ever obtained before.

R. E. RACHFORD & SON,

Grigsby's Bluff, Texas.

Flint Implements.

BY W. K. MOOREHEAD, GRANVILLE, O.

There are picked up nearly every day, by collectors all over the United States, hundreds of implements of various shapes, sizes and colors, and of different grades of workmanship, all of which are chipped from that well known material—flint. The material out of which these implements are made was probably quarried at Flint Ridge and carried from there to the home of the savage. This place was a favorite resort for the Ohio Indians, as numerous and deep excavations in the hill-side will testify. The Indians living at a great distance probably secured flint enough for all purposes in creek beds or along some mountain side.

In all cases after the flint was secured it was made into rough blocks resembling a large spear head. This reduced the size and made it easy to be transported to their homes. When once there, they could fashion it as they chose. (This statement I make in regard to their reducing the rough flint to blocks, I can prove by the following:—At the famous locality of Flint Ridge, Licking Co., Ohio, not far from the “pitts” are found spots about two hundred feet in diameter where the ground is literally covered with flint chips. There are also numbers of the flint blocks found on these spots. The chips prove that the blocks were reduced in size there.)

When once home the Indian gave his blocks to “the village arrow-head maker” who fashioned such implements as were desired. On the site of Indian villages in this State the spot where the arrow-head maker’s hut

stood can easily be found by the numerous chips, broken and unfinished implements which lie about on the ground.

Now that the flint is dug, transported and made into implements, let us classify these.

To the average collector there are ten general classes of flints. (Under each of these there are many subdivisions which space will not permit me to give.)

These ten are:—Arrow-heads, Spear heads, Knives, Scrapers, Drills, Lance heads, Gun flints, Discs, Celts, and Spades.

Arrow-heads are the most numerous kind. They present such a variety of forms that a classification is difficult. They may be divided into the following classes:—Triangular, leaf-shaped, barbed in top, rotary, barbed in side, and barbed at base.

These various forms of arrow-heads lead us to think that the smaller and sharper ones were used for small game. Some were used especially to shoot fish. Some collectors have even gone so far as to say that the triangular flint was used in war alone. That is a very good theory, but it does not stand the test as a fact. If an Indian was out hunting, with a quiver full of arrows, some pointed with triangular flints, others with barbed flints, and was to see an enemy, would he not shoot his barbed as soon as his unbarbed points?

The great Fort Ancient gives evidence of many a battle fought within its walls, and there are just as many barbed as unbarbed flints found there. We cannot, therefore, classify arrow points according to use.

Spear heads are readily distinguish-

ed from arrow-heads by their size. All points over two and one-fourth inches long (unless very light) are admitted to be spear heads. Spear heads often reach seven or eight inches in length, but ones longer are quite rare. Lance heads and spear heads are often confused; indeed it is very hard in some cases to tell one from the other. But the following rule will greatly help one: "Lance heads are usually leaf shaped, thin and delicately chipped and quite sharp."

Flint knives occur less frequently than the implements just mentioned. Knives, as a rule, are better made. They vary in length from one and a half to six inches. Some of them have the point chipped to a beautiful curve and are quite sharp. Others are high in the centre and slope to the sides. Most of them were made to use without a handle. Flint scrapers are rare in some localities. In central Ohio they occur in large numbers. It is supposed that these scrapers were once good arrowheads, but becoming broken, were chipped down to a broad edge, lashed to a stick and used to scrape hides, scale fishes, etc.

Drills are the most beautiful and symmetrical of all the flint implements. The material out of which they are made has to be of the best. The average length of drills is three inches. Some few have been found nearly five. The perforations in the slate ornaments were probably made with these drills.

Gun flints are often found. They can hardly be classed as implements, and a word will be sufficient to explain them. They were used by the Indians on the old flint lock muskets.

Disks, celts and spades are of similar forms, and hence, are very hard to

classify correctly. Round flat pieces of flint roughly chipped are found on the surface and occasionally in mounds. For want of a better term they have been called disks. Celts made of flint with well worked edges occur in certain localities. They bear a great resemblance to spades. Spades are large, spear-head-shaped blocks of flint. They are found in numbers in Missouri and Illinois. It is supposed that they were employed in throwing up the mounds and in loosening the earth so it could be readily scraped into baskets and carried to the embankments.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

F. C. LUSK, Holley, N. Y.—To exchange, first-class bird skins or eggs for works on birds; Gentry's preferred.

GLENN STEARNS, Circleville, Texas.—Would like to exchange minerals and birds' eggs for same. Send lists.

G. E. WELLS, Ames, N. Y., U. S. A.—Fine minerals, Indian relics, curiosities, rare coins, native woods, to exchange with foreign collectors.

A. B. ROBERTS, Weymouth, Ohio.—First-class eggs of White-rumped Shrike, Mourning Dove, Brown Thrasher, Purple Grackle, Eng. Sparrow, Grass Finch, Pewee, Cowbird, Catbird, Kingbird, and Robin for Indian relics or good curiosities. One fine fossil clam for every perfect arrow-head. Starfish, sea urchin, shark's egg, Chinese coin or 10 numbers Young Oologist for best offers of arrow-heads.

ALDEN LORING, Owego, N. Y.—Four perfect Indian arrow-heads for the first four numbers of this paper and the first three numbers of the Sunny South Oologist.

Harry Fox, Murdocksville, Pa.—An arrow-head, a red-headed woodpecker's or yellow-billed cuckoo's egg for the first number of the NATURALISTS' COMPANION. Fossil crinoids and stems for U. S. coppers earlier than 1845.

J. W. JACOBS, Waynesburg, Pa.—A collecting case (used for an egg collection; cost \$5; nearly new; size inside 4x10x30 inches; send for drawing) and a collecting box, size 4x8, for the best offer of birds' eggs. Will also exchange birds' eggs for same.

EUGENE W. GRAFFORD, Danbury, Ia.—I will exchange the following birds' eggs for others: Turtle Dove, Pewee, Kingbird, Robin, Thrush, Bank Swallow, House Martin, Prairie Hen, Blue Jay, and Yellow-shafted Flicker. I would like three specimens of each.

F. N. MASSOTH, JR., Hanover Centre, Ind.—Type writer, printing press and outfit, watch, books, papers, minerals, birds' eggs, Indian relics, coins, microscope, stamps, shells, and many other articles for a bicycle, rotary printing press, stamps, fossils of any kind or any, thing else.

G. D. STORY, Cartersville, Mo.—Minerals, woods, fossils and curiosities to exchange for minerals, fossils, petrifications, coins, fractional currency, Indian relics, ocean curiosities, match, medicine, playing card and revenue stamps and curiosities of all kinds. Books of all kinds nicely bound and in good condition, papers and magazines for books on geology, minerals, archaeology and natural history. Lists.

W. A. ACKERMANN, Marengo, Iowa.—Stamps of all kinds to exchange for Golden Days, coin sale catalogues, stamp, coin, and curiosity papers.

W. W. PHILLIPS, Clark P. O., Pa.—I will give a packet of 10 varieties of S. A. and African stamps for two perfect arrow-heads or two good minerals not less than $1\frac{1}{2} \times 2\frac{1}{2}$ in. not in my collection; also Longfellow's poems bound in cloth, for best offer in minerals, birds' eggs, Indian relics or any natural history specimens.

R. D. GOSS, New Sharon, Iowa.—To any one sending me \$2.50 worth (dealers catalogue prices) of first-class eggs with data (or \$2.00 worth, my selection) I will send recipe with full instructions for embalming birds and mounting them by the process which keeps them from moths, mice and sweet for ages. Have used it with best of success for past five years. Many exchanges last season; no complaints but many testimonials of its merits. Reference, J. A. Singley, Giddings, Texas, and Julius Schneider, Anaheim, Cal. Will also exchange for same value in Indian relics, fossils and minerals.

QUERIES AND ANSWERS.

W. W. P., Clark, Pa.—The bird described is the Cedar Waxwing.

G. S. W., Jersey City, N. J.—Your article is not the proper thing for a natural history journal; would answer better for a story paper.

N. F. M., New Salem, N. C.—The specimen sent is not a definite mineral specie, but a lithological specimen. It is a cleavable dentritic silica schist. Rather pretty but not worth much.

B. L., Leslie, Mich.—The egg sent for identification is the Field Sparrow's while the mineral is evidently limestone

G. S., Circleville, Texas.—The bird of which you sent feathers and egg is the Bronzed Grackle, the other bird and egg described is the Caracara Eagle. We cannot name the two white eggs sent unless you describe the nest, etc., and if possible the bird.

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VOL. II.

BROCKPORT, N. Y., AUGUST, 1886.

NO. 1.


The Shell.

Like a dawn in the midnight
Rose from their sea-weed chamber the choir
of the mystical sea-maids,
Onward they came in their joy, and around
them the lamps of the sea-nymphs,
Crimson and azure and emerald, were broken
in star-showers lightning
Far through the wine dark depths of the
crystal, the gardens of Nereus,
Coral, and sea fan, and tangle, the blooms,
and the plains of the ocean.

—Kingsley.

Burial Mounds of Manitoba, Canada.

BY PROF. CHAS. N. BELL, KINGSTON, ONT.

 EARCH has recently been made for the remains of the Mound-Builders in the Province of Manitoba, Canada. This Province is situated directly north of Minnesota and Dakota. Investigation has revealed the presence of several groups of burial mounds on the banks of the Red, Assiniboine, Pembina, and Souris rivers. Several of these mounds have been opened, and the articles found in them include human and animal bones, stone scrapers, tubes, pipes and mauls, bone needles and fish spears, copper chisels, awls and ornaments, gorgets, beads, and other ornaments cut from marine shells, pottery, etc., which are identical in character with those catalogued in the National Museum of the United States, as recovered

from the mounds of the Mississippi and Ohio valleys. The structure of the mounds already opened is the same as the ordinary burial description, though in one case there appeared to be an altar. There is a line of mounds from St. Paul, Minnesota, on the Mississippi River, up the Minnesota River, and down the Red River to Lake Winnipeg.

Living at Lake Winnipeg, the Mound-Builders must have known of the Nelson River emptying into the tide water of Hudson Bay, and of the great Saskatchewan with its feeders interlocking with those of the Mackenzie, flowing into the Arctic Ocean near Alaska. Pottery has been found on both the Nelson and Mackenzie, while none of the Indians living on those streams manufactured it when the whites first came in contact with them.

A careful comparison made between the mound form of burial and the scaffold and other forms practiced by the Indians of the Canadian North-west, as described by the French and English fur traders and adventurers who first entered the country, shows no similarity. The tribes have no traditions regarding these mounds, except in a few instances, and these have been proved absurd and without foundation. On the Rainy River, east of Manitoba, there is a mound of great size, measuring forty-five feet in height and several hundred in circumference.

The Cecropia Moth.

(PLATYSAMIA CECROPIA.)

BY GEO. H. BERRY, LIVERMORE, MAINE.

This is one of our largest moths, and belongs to the genus BOMBYX. My first acquaintance with it was made in the spring of 1882, when I found a moth laying her eggs on a small apple tree. I looked for the larvæ several times during the summer, but without success. I, however, found several on other trees, and in the fall, a couple of cocoons on this same tree; from these I raised a couple of fine moths. During '83 and '84 the Cecropia were very abundant. I collected about three hundred cocoons from the road-sides, edges of the woods, apple trees, etc. From these I raised thirty-four perfect moths; the remainder afforded me specimens as follows: Two needle ichneumons, (PELECINUS POLYCERATOR); twenty ORPHION MACRURUM, ten ORPHION BILINEATUS, forty TROGUS EXCESORIUS, and a large number of an ASILUS fly species unknown to me; there were also a large number of MICROGASTERS that I did not attempt to determine. I was surprised to find PELECINUS as a parasite on the Cecropia, as the only one I ever raised before was from a white grub, (LACKNOSTERNA FUSCA). During '85 I only saw one moth and I expect for a number of years they will be extremely rare.

The eggs are deposited directly on the leaves or twigs, usually one or two in a place, and seldom more than a half-dozen on a tree. They are nearly an eighth of an inch in length, bluish-green when first laid, but changing later to a dull yellowish-white. Their size makes them conspicuous, and as a con-

sequence a large number are eaten by the birds.

The full-grown caterpillar is nearly four inches in length, green in color, with from two to eight tubercles of red, blue, green and yellow on each segment. These are usually set with short, black spines.

The cocoon is firmly attached to a twig, usually on the south side of the tree; is pale brown in color, purse shaped, and is completely waterproof. Within this is a second envelope, oval in shape, and is attached to the outer by numerous threads. The pupæ is dull black, without gloss, and soft to the touch. Many cocoons are destroyed by both squirrels and birds.

The moth is nearly six inches in alar extent, and is one of the most beautiful of our native lepidoptera. The ground color of the wings is a reddish-brown, the edges being surrounded with an irregular wavy border of light and dark drab. About three-fourths of an inch from the edge is a line of white, edged and shaded with red, and in the center of each wing a crescent shaped spot of white, shaded with red and bordered with black. At the outer angle of the front wings is a circular spot of black, edged by a crescent of blue, and surrounded by a patch of red and blue shading. Where the fore wings are attached to the body there is a triangular spot of red, edged with white. Body, red, striped with white; antennæ, feathered; legs densely covered with reddish hair. I have had three of four in which the ground was nearly black and the markings pure white; the entire moth lacking the red shading.

They feed on maple, oak, apple, cherry, thorn, sumac, willow, and I have found them on juniper and cypress. I

have tried to reel the silk from the cocoons, but never succeeded. The silk is strong, but coarse, and would make good fabrics; but owing to the difficulties in reeling, it will probably never be utilized for any other purpose than as a curiosity.

The Ruby-throated Hummingbird.

(TROCHILUS COLUBRIS.)

BY FALCON.

This, the smallest of our northern feathered beauties, is about three and a half inches long. His plumage is golden green above, golden red about the throat, purple-brown on the wings and tail, and white beneath. All these hues have a brilliant metallic lustre, which changes with every movement. Although he is small, he is very brave and has no fear of any larger bird. He has even been known to alight on the head of an eagle and pull the white feathers out in mouthfulls, while the royal bird goes screaming through the air in unsuccessful attempts to get rid of his small tormentor. The nest is very small, being about an inch and a half in diameter. It is usually placed on the top of a bough and rarely at the sides of the trunk. The outside is so nicely covered with lichens and bark that it resembles very closely a knob of the tree. The inside is composed of vegetable down, such as that of the downy thistle. The nesting place varies; sometimes an old apple tree is selected as a place of residence, and then again a low shrub in some garden. The eggs, two in number, are pearly white.

What do you think of the appearance of this number?

Mahwa Flowers.

A SUGAR-PRODUCING BLOSSOM.

BY G. D. STORY, CARTERVILLE, MO.

Attention has been publicly drawn of late to "Mahwa flowers"—the corollas of *BASSIA LATIFOLIA*—as a cheap source of cane-sugar. This species of *BASSIA* is a tree attaining to a height of forty to sixty feet, and common in many parts of India, especially in Central Hindoostan. It has oblong leaves of firm texture, five to six inches long; these fall in February, March and April, and are succeeded in March or April by the flowers. These last for two or three weeks, and then begin to fall. The falls take place at night and continue sometimes for a fortnight. The fruit, which resembles a small apple, ripen in three months; the seeds, one to four in number, yield an edible oil on being pressed. It should be added that the trees are self-sown, and that they flourish in very poor and stony soil. When the Mahwa tree is in bud, the ground beneath it is cleared of weeds, sometimes by burning. A single tree may yield as much as 500 to 700 pounds of flowers; even a ton is asserted to have been collected from one tree. These flowers have a luxurious but peculiar taste when fresh; when dry they resemble in flavor inferior figs. They form a very important addition to the food of the poorer classes in those districts where the tree abounds, particularly in the neighborhood of woodlands and jungles. They are especially useful in economizing cereals in seasons of famine and drought. It is not, however, as a direct article of food, nor as material for the preparation of a rough spirit by fermentation that Mahwa blossoms are now recommended. It has been affirmed that they may be employed as an abundant and very cheap source of cane-sugar.

"That Rotten Material."

CINCINNATI, O., Aug. 16th, '86.

Mr. Guelf, Editor.

With your permission I would like to say just a few words in regard to the burnt or rotten cloth found in a mound Mr. Wigglesworth described.

Samples of this cloth are quite rare. Very few collectors have any of it. In some mounds quite a supply of it is found, but always in a condition which renders its preservation difficult. Foster in his excellent work, "North American Pre-historic Races," describes the cloth, its texture, etc. Some found in a Piqua County (Ohio) mound is in my possession, and is sealed between glass plates to keep the air from decomposing it. It is woven in a very simple manner; the threads being as coarse as those used in our modern coffee sacks. It was evidently made from vegetable fiber. The Indians had so little of it that it seems to me improbable that they should make a tent out of it (as Mr. W. says). Besides, it is woven so loosely that it would form no protection against rain. It is not strong, and a wind would tear it. It might have been used to cover the face or part of the body of distinguished dead; and again it might have been used by the medicine men or in ceremonial proceedings. We never heard of a tent being used in connection with burying. The nearest approach to a tent is the modern method of the North-west tribes of burying the dead in lodges raised on poles, with the covering of a few boards.

At any rate we cannot POSITIVELY say what the cloth was used for. Each has a right to express his opinion, of course. I have given mine.

W. K. MOOREHEAD.

The Red-tailed Hawk.

(BUTEO BOREALIS.)

BY J. W. JACOBS, WAYNESBURG, PA.

While strolling through the woods on the 25th of April, I spied a large and bulky nest, in one of the tallest oaks in the woods. Knowing that there was a nest of this hawk in the vicinity last season, and thinking this was the old nest, I did not take much notice of it. I had hardly gone a hundred yards further when I saw another nest, similar to the first but not so high. I threw stones at this nest, but could scare no bird from it. On going back to the first nest, I thought I could see a large head peering over the edge. I picked up a stone and tapped on the tree, and as I did so, a large Red-tail flew from the nest. Knowing that there was a fine set of eggs in the nest, I began at once to ascend the tree, which was so large that I could not reach half-way around it, but the bark was coarse, and I made my way with difficulty to the first branch, which was about twenty-five feet from the ground.

Gaining the first branches, I could now make my way to the nest very easily. When I was about half-way to the nest, I heard the cry of the mother bird, and on turning, saw her perched on a tree about a hundred yards away, and just as I reached the limb nearest the nest, I heard the cry again; this time she was not forty yards away.

A moment later and I looked for the first time upon a set of eggs of the Red-tailed Hawk. Thinking I could carry them to the ground safer if they were lighter, I began to blow them. I had just begun blowing the first egg when I

was frightened so badly I almost choked on my blow-pipe. There, not fifty feet from me, was the mother bird, perched on a limb, uttering those prolonged screams, and beating the branch impatiently with her wings. Not having my collecting box with me, I dropped an egg in each coat pocket and started for the ground, which I reached in safety. The eggs were two in number, and measure 2.50×1.87 and 2.56×1.86 . They exhibit great variation, both in size and color. One is dirty white, spotted with large blotches of chestnut and amber brown, and some faint markings of lilac; the other is much darker. The nest measured over four feet in diameter, and was composed of large sticks and twigs, lined with leaves and moss; was almost flat on top, and was placed in a sort of horizontal fork, eighty-five feet from the ground.

CORRESPONDENCE.

Thank you for your favor of No. 12 of your magazine. It seems very creditable, and you no doubt get a great deal of enjoyment and practical experience from it.

WM. R. DUDLEY,

Professor of Botany,

Cornell University, Ithaca, N. Y.

While planting corn last spring, I found two perfect war-points and a common arrowhead. The latter was almost perfect and just one-half inch long. You said the department on archæology would continue just as long as the readers took an interest in it. Well, if they are all like myself, it will not stop soon.

HARRY FOX, Murdockville, Penn.

While camping at the lake, last month, we noticed, among other peculiarities of bird life there, that the Swallows were very pugnacious, attacking Kingfishers,

Woodcock; Duck, Great Blue Heron, and on one occasion a Swallow was seen to attack a Pigeon Hawk, but he evidently got the worst of the bargain. We also observed a perfectly white Swallow among a large flock of Barn Swallows, but could not draw a bead on him.

Ye Editor.

On the 25th of June I caught a young Great Horned Owl, (*BUBO VIRGINIANUS*). He is nearly full grown, and although I have had him over a month, he is not in the least tamed. I feed him on rats, mice and meat scraps. I found a sunflower with lignate corollas in the centre of the head. It is the first I have ever seen, and do not know whether it is a rare occurrence or not.

ARTHUR J. COX, Iowa City, Ia.

The following is a list of eggs collected by me this season :

April 18—One set of Mourning Dove.

19— “ “ Am. Robin.

20— “ “ Card'l Grosb'k.

21— “ “ Common Crow.

22— “ “ Pewee.

30— “ “ Woodcock.

May 1—One set each of Belted Kingfisher, Red-and-buff-shouldered Blackbird and Bluebird.

May 2—One set of Meadow Lark and Chipping Sparrow.

May 3—One set of Meadow Lark.

4—Two “ Yellow-shafted-

5—One “ Chewink [Flicker

6— “ “ Bl'k-cap'd Titmice

9— “ “ Chewink, Meadow Lark, Black-capped Titmice ; two sets of Blue-gray Gnatcatcher, and seven Cowbird's eggs in one Pewee's nest.

May 12—One set of Blue-gray Gnatcatcher, and two sets of Yellow Warbler.

May 15—One set of Wren and Bee Martin.

J. W. JACOBS, Waynesburg, Penn.

The American Crossbill.

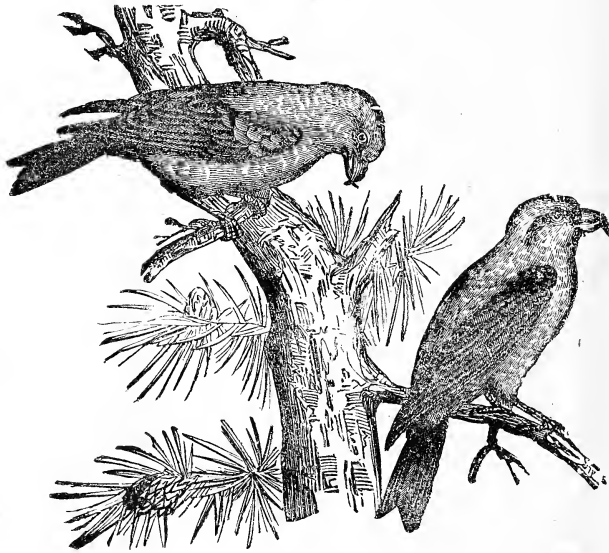
LOXIA CURVIROSTRA AMERICANA.

BY NAT U. RALIST.

The American Crossbill, known also by the name of Red Crossbill, is one of the handsomest of our birds, as well as one of the most peculiar. These birds have long been celebrated on account of the singular form of their beak, from which they derive their name.

the ordinary faculties of birds, and to be as capable of obtaining its food as any of the straight-beaked birds.

The Crossbills obtain their principal food, the seeds of firs and pines, by tearing up the cones. They bring the points of the mandibles together—which they can do so as to pick up a very small seed—and insert them into the cone, when a powerful lateral movement widens the opening quite sufficiently, and the tongue, which terminates in a singular movable scoop, is inserted to



In these birds the two mandibles—which are rather long, thick at the base, and much curved, crossing each other at the points, when the bill is closed. In different individuals, even of the same species, the upper and lower mandibles are found variously directed to the right and left. The structure, when first seen looks not unlike a malformation, and to prohibit the bird from picking up seeds or feeding itself in any way. But when seen feeding, it speedily proves itself to be favored with all

detach the seed. It is also very fond of apple-pips, and, settling on a tree where ripe apples are to be found, attacks the fruit with its beak, and in a very few moments cuts a hole fairly into the core, from which it daintily picks out the seeds and eats them, rejecting the ripe pulpy fruit in which they have been enveloped. As the Crossbill is rather a voracious bird, the havoc which it will make in an orchard may be imagined.

The male, as is the case with all birds, has the most beautiful plumage. The

throat and breast are red, with here and there a few feathers of drab and yellowish-green; while the head and back are prettily colored with a variegated mixture of green, brown, and red, all of which have a peculiar metallic lustre; wings, black, turning to a brownish hue at the shoulders; abdomen, drab; tail, black; tail coverts, bright red; bill, black, and three-fourths of an inch in length.

Although Dame Nature has not decked the female with quite so lavish a hand, she is, nevertheless, very prettily arrayed. The throat, head and breast are clothed in a mixture of yellow, green, red and drab; back, red, green and black; tail feathers, black with white margin; tail coverts, bright yellow; abdomen, drab; wings, black and white. The total length of the Crossbill, from tip of beak to extremity of tail, is six inches. The tail has a very deep notch in the end, which is very conspicuous when flying.

The nest is generally built in fir trees in a somewhat secluded spot, and contains generally four greenish-white eggs, spotted and dotted with varying shades of lavender-brown, with a few heavy surface spots of dark purple-brown. The eggs average in size .75 by .56.

OBITUARY.

Frank K. Rising.

We now have the sad duty of recording the first death in the ranks of our subscribers. Frank K. Rising, the well known writer and rubber stamp manufacturer, died at his home in Lena, Ill., on June 29th, 1886, at the age of 19 years. He was a writer of more than ordinary ability, and had written a number of articles on scientific topics for a great many journals, including the

COMPANION, under the nom de plume of "Kinney." His friends and relatives share the sympathy of the Editor in their bereavement.

Limestone.

Read at the first annual meeting of Chapter 760 of the Agassiz Association, Jamaica Plain, Mass.

Continued from last issue.

In making mortar, the quick-lime is mixed with water and silicious sand. The strength of the mortar depends on the formation of a compound between water, lime and sand. The finer the sand, the more thorough the combination. Hydraulic cement is so called because it will set under water. It is made from limestone containing silica and alumina. Less sand is needed than with ordinary lime.

Almost all shells effervesce with hydraulic acid in the same manner as calcite does, showing that they must be composed of calcite or carbonate of lime. In the ocean, vast quantities of carbonate of lime are held in solution. This is used by the coral polyps and the mollusks to make their skeletons. When they die, their shells are left behind them and accumulate on the bed of the ocean; and in time they unite and form limestone.

Coquina, which is found in large quantities in Florida, is a variety of limestone in process of formation. Although it is porous and appears very friable, it is really quite firm; the shells uniting strongly wherever they meet. In course of time the spaces between the shells will be filled and we shall have solid rock containing fossils. After considerable time has elapsed, it may become crystalline, as in marble and calcareous spar; and all traces of the

fossils will be obliterated. Crystallization is a sign of great age.

As I said before, the ocean holds vast amounts of carbonate of lime in solution. This is deposited in the same manner as salt; by the water evaporating in certain places where it has been isolated by some change in the form of the earth's surface, leaving a bed of limestone. Limestone is not formed in this manner at the present time, but we have good reason to believe it was formed so ages ago. A similar method is that which forms calcareous tufa, which is limestone deposited by water; such as mineral springs, geysers and rivers.

Water leaking into the roof of a cave often contains calcite in solution. The water evaporates leaving the calcite. In time quite an amount of calcite will be left in the form of an icicle, called a stalactite. When more water leaks through than can be evaporated, some falls to the bottom of the cave, and the calcite in it forms an inverted icicle called a stalagmite. Sometimes these stalactites and stalagmites meet, forming pillars.

The granular and crystalline varieties of limestone are called marble; but marble is not a scientific name, and may mean any rock that is calcareous and takes a polish. The finest and purest white marble is used for statuary. The finest marble comes from Carrara, Italy; the Island of Paros, whence the name Parian; from Athens, Greece; and from Ornofrio, Corsica. Many of the fine Greek statues are made from Parian marble. The statuary marble found in the United States is not of a good quality, but good building material is abundant. The best kinds of building marble are not excelled by granite for durability.

Chalk is a white and earthy variety

of limestone. This must not be confounded with the chalk used to mark on a blackboard, which is made from clay. Chalk is abundant in Europe, but is not found in America. When examined by the naked eye, it seems to be destitute of organic remains, but when seen under the microscope, it appears to be a mass of shells. Chalk is composed of the shells of Foraminifera. Although the chalk which we see now was formed ages ago, we have good reason to believe that chalk is being formed at the present time. There are thousands of square miles in the deeper parts of the ocean where the dredge brings up little more than a gray calcareous slime or ooze. When examined with a microscope, it is found to be composed principally of Foraminifera. When this ooze is dried and pressed, it forms a white rock like chalk; it is, in fact, a modern chalk. The crystalline varieties of limestone are termed spar. Many of the crystals are very beautiful. Nail-head spar and dog-tooth spar are so called because of their resemblance to those objects. Iceland spar is a transparent variety. It derives its name by its first being found in Iceland. Satin spar is a finely fibrous variety with a satin lustre. Marl, which is of great value in agriculture, is a mixture of carbonate of lime with clay. It often contains fossil shells.

THE END.

Mr. J. H. Martin, in "Science Gossip," says that a good method for preserving fungi is to place them in a solution of one part calcium chloride (chloride of lime) and ten parts water. This will change the phosphates of the fungus into phosphate of lime, after which they will be found to keep well.

THE .. NATURALISTS.
COMPANION.



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We request all of our readers to send us a description of their
Collecting Excursions, their Finds, or any items they may think
will be of interest to the readers of the COMPANION.

CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

ASSOCIATE EDITOR,

H. F. Thompson, Indianapolis, Ind.

RANDOM NOTES.

The Southern Geologist has suspended publication.

The NATURALISTS' COMPANION and the Young Naturalist's Journal both one year for only 50 cents.

P. T. Barnum offers \$20,000 for the skin of a sea serpent such as was believed to have been seen off Rockport, Maine.

W. G. Talmadge, Hartford, Conn., has our sincere thanks for a copy of "Birch Bark from the Adirondacks."

We were somewhat delayed in issuing this number by our paper failing to come to hand promptly.

G. D. Story, Carterville, Mo., has our thanks for a fine specimen of the mineral sphalerite.

Unless some of our advertisers begin to settle up soon, we shall be obliged to place the bills in a lawyer's hands for collection.

Parties desiring to secure a fine specimen for their cabinet cannot do better than purchase one of those sword fish swords of A. C. Randall.

In overhauling our sanctum recently, we discovered several copies of No. 1, Vol. 1, which we will sell at five cents each.

The fall of a meteor on ice was lately witnessed on the coast of Norway, a hole a foot and a half in diameter being made through eight inches of ice.

Parties in want of fine specimens at extremely low rates should review the advertisement of A. N. Fuller, of Lawrence, Kansas, on another page.

Students of archæology should give some attention to mythology. They will find that study one of great interest, and there is ever a field of wide research open.

Publishers of scientific magazines will please send two copies of their journals—one to this office and one to our associate editor—and we will return the compliment.

Circumstances renders it impossible to give our readers a history of our camping excursion, as we formerly intended. Sufficient it is to say that we enjoyed ourselves immensely, and returned to our sanctum looking as brown as Indians.

Crystals.

BY W. S. BEEKMAN, WEST MEDFORD, MASS.

The majority of us, busy with the cares and trials of an active life, have but little time to occupy our attention with the intricacies of nature, and when we come in contact with a friend who does have the time and taste, we are somewhat impressed by his ardor, and wonder, when we leave him after a pleasant half hour's talk, why it is that we have never found such beauties in the objects that are in our daily avocations. Crystals are not such an uncommon thing as we are apt to suspect, and perhaps, one of the things used several times every day of our existence will consist of thousands of perfect symmetrical figures. But when a room full of company, who have asked to be introduced to a few of these novelties, are asked to look at these finely formed particles, one and all fail to recognize the substance, but will comment upon its regularity. This substance is exhibited to them in a slightly magnified condition, and does not seem possible to some that they are little grains of sugar. I wonder how many of the readers of this magazine, not directly interested in looking at magnified objects, can give a correct description of the form of a grain of sugar. There may be many who, when looking under a magnifier, may recognize a grain of sugar by its form, when mixed with a number of other forms, but when using a spoonful of sugar at the table, do they see the form of each little grain of sugar, as it rolls over and over in its downward course, as it appears under the glass? If not, that may be one reason why we find it discouraging work at times, to

proceed intelligently in our study. When we sit at a magnifier, we are ready to note all it may show; but, when it comes to remembering half we have thus seen, it is another task.

A college mate of mine, who took the honors in chemical work, left for the West some time ago. Quite recently he sent me a little package by mail, from where he was at the time in Wyoming, containing a number of curiously shaped particles. A note accompanied the package stating how he was walking in a valley, and observed these singular grains, and that he was quite surprised to find they were all nearly of a shape and size. He wanted me to give some explanation as to why they should all have been worn in that peculiar shape. I wrote back that they were not water-worn, but genuine crystals, called magnetite, and were formed according to laws of crystallization, that has thus far eluded our searching grasp almost completely. In answer, he remarked if that form should have occurred during a chemical operation, he would instantly have recognized a substance crystallizing in the octahedral form, of the regular, or cubical system, but out in the valleys, like the person at the table, natural inference was lacking.

The ordinary idea of crystal, appertains to rock crystal, or some bright clear substance, as crystal glass, or "clear as crystal."

Rock crystal, as found abundantly in Nature, is a beautiful substance, and has been admired by us all. It is found in nearly every portion of our country; most frequently as a fine brilliant or drusy coating in the crevices of rocks. It is generally stained various shades of yellow, due to iron. In a few localities the small brilliant points, instead of ab-

ruptly coating the rock, are raised upon a pretty pedestal, as it were, and are sometimes from a quarter of an inch to a foot in length. These pedestals are peculiarly shaped, if we notice, and are regular six sided prisms, covered or terminating in six sided pyramids, which are the points covering the rocks in our first observation, only; as they were not so prominent, our brief glance failed to notice the regularity of their sides.

At one locality the crystals are pointed at both ends, and are exceedingly brilliant. These are the Herkimer crystals, and little gems they are. One can, in these little crystals, find objects for their cabinets that will be a source of more pleasure than any other specimens they may possess. To say they are beautiful, is but faintly describing them. Of course there are to be found parties who can show you Herkimer crystals that may fail to excite your interest, in as much as they are inferior specimens. The complications of the hexagonal system, as observed in a handful of these little crystals, offers a vast field for observation. I have before me a number of these gems, and will endeavor to give some idea of their beauty. A little box containing a dozen crystals, about two-thirds by one-half inch in size lying on pink wool, are of dazzling brilliancy, and only lack splendor to outdo so many cut diamonds. But to place this box of brilliants, worth the small sum of a dollar, by the side of a similar box of native diamonds, worth, if of equal size, thousands of dollars, and offer them to one hundred people, successively, who knew nothing of their value, ninety-nine would invariably select the quartz brilliants. Another box contains a few "twins," of great whiteness, but in the centre is a glossy black speck of

free carbon; giving an excellent contrast of the two extremes of light and dark; transparency and opaqueness. One "twin" is nearly like figure 194 in Dana's, a rare geniculation. The next box contains seven greenish-black crystals, where the impurity is diffused through the quartz. On holding one of these crystals to the light, one can see the greenish form is enclosed by a clear layer of quartz, forming hidden crystals. Passing along, I come to a beautiful, clear, regular crystal, with not a sign of an imperfection visible until it is examined by transmitted light, when there is perceived a very dim shadowy outline of a crystal, which is a "phantom." This whole paper could be used up in thus giving inadequate descriptions of these lovely forms of crystals.

We will send 100 sheets of unruled writing paper post-paid for 25c.

We can supply all back numbers of this paper at five cents each.

We will print your name, address and business on 100 good envelopes and send post-paid for only 40 cents, silver.

The C. A. Templeton Co., of Plymouth, Conn., are prepared to furnish electrical novelties at low prices.

Chas. H. Marsh, the well known ornithologist, has gone on a collecting expedition in the San Diego mountains. We wish him the best of success.

Through the kindness of the publisher we have received a couple of numbers of the popular "Humboldt Library." It is one of the cheapest and best scientific magazines published, and treats on all subjects of interest to the scientist. Price only \$1.50 per year or 15 cents per copy. Address the publisher, J. Fitzgerald, 393 Pearl St., New York.

The Oological Collector.

BY G. H. SELOVER, LAKE CITY, MINN.

There is considerable difference in the use of this term and the more common one, "egg collector." As defined in the last issue of this magazine, the "egg collector" is one who strives to allay the stings of conscience by taking only one or perhaps two eggs instead of the whole set, and argues that the bird "can't count" and don't know the difference.

It is evident that this kind of collector generally cares nothing for the eggs he takes, except as mere curiosities to be shown to friends, and to be kept and continually added too, for fear that the boy on the other side of the street will "beat" him and "show off" the larger assortment of eggs. As a rule, this class of collectors know very little about the owners of their eggs, and is only interested in "getting all he can and keeping all he can get."

How different from those who make the birds their study and the observation of their habits the occupation of their leisure hours? These persons desire to learn all they can about the feathered tribe, and, as the most convenient and very best way of doing so, they collect the eggs and nests of the various birds; and not to "show off" as you would fine animals or curiosities, but to study. In fact, the collections of the most studious, and of those who derive the most benefit from that study, although sometimes it may be very large and rare, are seldom seen or heard from. They do not spend their time on eggs and birds for show, but for silent study and for the benefit it will give them.

It is often stated that it makes no dif-

ference to a bird if you take an egg or two from the nest; but this is disproved by facts and by ordinary observation, for there are very few birds which will not give vent to cries of distress on returning to a nest from which one or two eggs have been taken. Let the upholders of that doctrine take the trouble to watch a few birds and I am convinced that they will find themselves in the wrong.

Then, again, a collection of single eggs has no scientific value. To be sure, they represent the fact that such and such eggs were laid by such and such birds; and only this one fact is attached to them. But, on the other hand, as a full data should be kept with all sets, you have the scientific name of the species, the time of breeding of the species in a given locality or latitude; some idea as to its geographical distribution, the state of incubation of the eggs as well as their number, the position, and the material of which the nest is composed—a whole history and description of the breeding habits of the species. With this system an oologist can set down and in a few minutes learn these facts concerning birds which do not breed within a thousand miles of his home.

Some contend that this way of collecting is "so cruel," and yet they say "the bird cannot count," and if so perhaps the bird would not notice the difference whether a half or the whole of the set was taken. And as they advise the collecting of single eggs, or eggs in pairs—and only for show—why cannot sets be collected, considering the good that arises from it? And as they say that the bird replaces those which are taken by the "egg collector," why can't she forget them all and deposit another full complement?

As far as cruelty is concerned, if there is any cruelty in it at all, there must be as much in taking a half as the whole of a set.

Then there is another thing which the "egg collector" does, which the student of oology would not think of doing. Most of them, instead of keeping their "collections" in boxes or cabinets for the purpose, either use them as ornaments(?) at their homes, by stringing them and hanging them up about the rooms, or sticking them on pasteboard or cloth for easy manipulation while "showing them off."

This, more clearly than anything else, shows that the vocation of the "egg collector" varies greatly from that of the oological student. I, for one, am glad to note the great progress of the later and the great retrogression of the former class of collectors; and I hold that any person who attempts to propagate the old ideas of the "egg collector" should be considered an enemy to all true progress in the science, and that any and all such attempts should be frustrated.

A Visit to a Zinc Mine.

BY C. S. MASON, EASTON, PENN.

A short time since I went out on a tramp to Fridensville, (Pa.) after minerals. This town has probably 500 or 1,000 inhabitants, and lies nestled among the hills, being four miles from Bethlehem and five miles from Allentown. Here are found extensive deposits of zinc. Two large pits or beds are now being worked. Each bed is about 350 feet wide by 1,000 feet long. All workings in the mine are carried on in the open air just the same as in marble or limestone quarries, Scarcely any

tunnels are made, excepting between wide layers of rock, where the deposits of zinc silicate (calamine) are found.

The ore is hoisted out of the mine by the aid of a small dummy engine, which works independent of the large pumping engine, a description of which may be found in the Scientific American Supplement, Vol. 11, No. 32, August 5th, 1876. But for those who are unable to procure the paper, I will copy it as I found it.

"The engine has a pumping capacity of 15,000 gallons per minute, and can be run up to 19,000 gallons per minute in case of an emergency. The water is raised from a depth of 350 feet.

The "President" (the name of the engine) weighs 650 tons, and including the pumps and boilers, the total weight is 1,000 tons.

The cylinder is $110\frac{1}{4}$ inches in diameter; length of stroke, ten feet. The heaviest pieces of iron in the engine are the sections of the walking-beams, each of which weigh twenty-four tons. The fly-wheels weigh seventy-five tons each; crank pins one ton each. The piston-rod is fourteen inches in diameter; the cross-head weighs eight tons; the connecting-rods have nine-inch necks and are fifteen inches in the middle, forty-one feet two and one-half inches in length, and weigh eleven tons each. There are also two air-pumps, each fifty inches in diameter.

The engine-drives, or plunger-pumps, each thirty inches in diameter by ten-foot stroke; and four lifting pumps, each thirty-one and a half inches in diameter by ten-foot stroke. The plunger-pumps are uppermost and stationary, the lifting pumps being in the bottom and movable, so as to go up and down as the shaft is sunk. To handle these lift-

ing pumps and for hoisting or lowering them at pleasure, a steam capstan, capable of lifting fifty tons vertically, is used. The capstan is worked by a series of strong gearing, a drum and a steel wire rope. With this capstan, if anything goes wrong with the pumps, they can be taken hold of by the top, pulled out of the water, repaired and put back again in a very short time."

This is about the largest fixed single engine in the world; that at Harlem Meer being a compound engine with one cylinder within the other. The *Scientific American Supplement* is illustrated with front, side and horizontal elevations.

It was thought of very strongly at one time to lay iron pipes from Fridensville to Philadelphia to supply the latter city with drinking water, as the water which is pumped out of the mines is very clear, clean and pure. For some reason, however, this giant scheme fell through.

While a description combined with illustrations may be very exact in every detail and part, still this fails to convey the immensity that immediately stamps itself on the mind of one who looks on the engine for the first time.

The engine, works and ground belong to the Lehigh Zinc Company, who have erected large smelting and ore reducing works. This company have, within the last year, added oxide works, which they moved from Bergen Point, New Jersey.

In and around the mine some very fine specimens of massive blende, calamine, sulphur, iron pyrites, calcite, quartz, greenochite, blue and red carbonates of zinc, and various coatings are found. Iron pyrites or sulphur and blend is called "mundig" by the miners. As a general rule, the miners are willing to give or show where fine specimens are to be found.

Relaxing Dried Skins.

Select the skin or skins to be relaxed and remove all the cotton from the body, head, eyes, etc., and refill with wet cotton, also wrap a quantity of the same around the legs. Procure a tin or wooden box of a size sufficient to hold the skins to be relaxed, fill it full of well wet sawdust. Now wrap the skin in a sheet of clean white paper and bury it in the sawdust. Let the skin remain from two to five days, or longer, depending upon its size; if left too long the feathers are apt to start. When soft enough take the skin from the box and remove the cotton from the inside. Turn the skin completely inside out to base of beak, then turn it back again. This will break the stiffness and make the feathers assume their natural appearance; any buncy place should be manipulated with the fingers until made soft. Any bend or crimp in either the wing or tail feathers can be readily removed by holding in the steam from a kettle. When the skin is prepared as above, proceed the same as with a fresh one.

An Unusual Friendship.

June 11, 1884, I saw what I took to be a Robin's nest in a maple tree on a public avenue. Upon ascending, was surprised to see a Robin and an English Sparrow fly from the nest, which was like an ordinary Robin's nest, except being thickly lined with feathers, which were well embedded in the cement of the outer nest. It contained three eggs of the Robin and six of the Sparrow, all evenly and highly incubated. The eggs were not intermingled, each kind being on a side in a slight depression, but not separated from one another. The

feathers which lined the nest, except the small ones on the bottom, were stuck quill ends in the cement, and the tops or feather ends curved inward, so as to nearly conceal the eggs. The Robin and Sparrow had been setting side by side on their respective eggs.

It may be mentioned that these birds are usually enemies.—THE OOLOGIST.

Do Flying-Fish Fly?

The question "Do Flying-Fish Fly?" seems to me should have long since been settled in the affirmative. Many years ago the writer was engaged in trading voyages in the South Pacific ocean, where the flying-fish were to be seen daily. They would generally rise in shoals, which flutter from wave to wave from fifty to one hundred yards before settling in the sea. Again individual fish would rise, flying comparatively higher, their flights sometimes being from one hundred and fifty to two hundred yards long. The school fish were the smallest in size, and would bury in the crests of the waves in crossing them, while the individual fish would, at most, simply touch the spray of some of the waves in passing. These last fish seemed to range from fifteen to twenty inches in length, were quite thick, had a reddish color about the head and shoulders, and in flying often made curves from a straight line, as if avoiding the vessel or some danger in the sea.

There could be no spring or jump in the matter, except to emerge from the water when starting, the flight being caused by the wings, which vibrate as quickly and like those of the humming-bird. Further than all this, it is only necessary to examine the wings of a flying-fish and it will be seen they are

too long, yielding and fragile to admit of using in so dense a fluid as sea water. My theory is, that the flying-fish used their tails and small fins to raise themselves out of the water, and made their flight by the large fin wings while in the air; further, that they touch the waves simply in passing as a rest, the larger fish being stronger making longer flights, toward the end of which they seemed to sail with wings extended until they drop into the sea.—AMERICAN ANGLER.

To Remove Grease from Bird Skins.

It is accomplished by the following method: When the inside of the skin is greasy sprinkle liberally with plaster of Paris, and scrape with a blunt knife, removing the plaster from time to time until the grease is thoroughly absorbed. White birds are very liable to be greasy; if it be the feathers, wash the greasy ones with turpentine, sprinkling with a thick coat of plaster, which should be removed as soon as it becomes saturated with turpentine, and more applied. The feathers must be moved and brushed about to permit the plaster to penetrate. Finish by shaking or blowing until all the plaster is removed. This is a slow method, but the results amply repay one for the time spent.—HOOSIER NATURALIST.

It has long been a question of doubt as to how far beneath the surface the roll of the ocean could be felt. A diver at work on the Oregon at a depth of 120 feet found it so heavy that he could not keep his position while making fast to a trunk which was to be hoisted up.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.--Ed.

BURT LONGYEAR, Leslie, Mich.—One good specimen of petrified wood for every good labeled curiosity.

A. J. COX, box 1713, Iowa City, Ia.—Polished or unpolished Devonian corals for fossils, Indian relics, minerals or marine specimens.

GLENN STEARNS, Circleville, Texas.—A microscope, cost \$3.00; a book, "Empress Josaphine"; and a set of eggs of Scissor-tailed Flycatcher and Cardinal Grosbeak, for a good pair of climbing irons. Write, stating style.

C. D. PENDELL, Waverly, N. Y.—I would like to exchange some of my duplicate minerals and a magic lantern for books on any branch of natural history, a magnifying glass or offers. Send for list of minerals.

C. W. STUTESMAN, Bunker Hill, Ind.—I wish to exchange my 16-page coin and stamp catalogue with other collectors and dealers in coins, stamps, relics, etc., or for 15 var. foreign stamps, or 3 good foreign coins.

QUERIES AND ANSWERS.

Mrs. L. A., Bridgewater, Vt.—Bird lime may be made as follows: Take one pint of linseed oil, put it in a pot of not less than three times that capacity; place over a slow fire and stir while boiling with a wooden spatula; continue until it is thick as required. This can be determined by cooling the spatula in water and trying if it will stick to the hand. When sufficiently done pour in

cold water and it will be ready for use.

W. W. P., Clark, Pa.—We believe Wilson's American Ornithology the very best book published for the money. It is very fully illustrated, with over 100 full-page colored plates, representing upwards of 500 American birds, in their true plumage. The work is complete in three vols. of some 1,500 pages, describing the habits and nature of every known bird in the U. S. Price, per set of three vols., cloth, at this office, \$18.00.

We have some specimens sent us for identification which we will endeavor to name in our next number.

The South has recently been very severely shaken by earthquakes.

We shall soon issue an "Agent's Directory" for John Carmichael, St. Raymond, Quebec.

We have an interesting paper, for the September issue, from the pen of Wm. M. Beauchamp, D. D., entitled "Surface Finds," and for which he has our sincere thanks. Archæologists should not fail to procure a copy of the number containing the article.

We notice that one of our subscribers, W. H. Plank, Wyandotte, Kansas, has taken upon himself the publication of a neat little magazine, entitled "The Agassiz Companion." It is well edited, and with a little energy and "push" on the part of its editor, it will make a fine success.

For only \$1.00 (postal note) we will send Davie's famous Egg Check List and Key to the Nests and Eggs of N. A. Birds, describing the nests, eggs and breeding habits of every North American bird, and one year's subscription to the COMPANION. The regular price of the book alone is \$1.00.

The Naturalists' Companion.

"Wheresoever the Naturalist turns his eye, life or the germ of life lies spread before him."--Humboldt.

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CHARLES P. GUELF,
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Single Copy,
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Then and Now.

The sun looked down on a sargasso sea,
There sediment was being laid down;
Rolling prairies there were to be,
Coal veins in time be found.

No sails were spread on that wide ocean blue
No argosies did there go down;
Each atom there, to its affinity true,
Its primal dual atom found.

Giant ages then did roll along,
Then came lead, copper, silver, gold;
At last man was evolved to sing his song,
And own this metal, wealth untold.

The mountain ranges, they had come to-day
Broad valleys did lie between;
Earth's giant rivers there transported clay—
There conic iron knobs were seen.

There populations on grand prairies wide—
There continental cities stand;
A cereal sea waves on the mountain side,
There are the corn and cotton lands.

—Van Cleave Phillips.

Meerschaum.

(SEPIOLITE).

BY DR. B. F. MASON, SAN LEANDRO, CAL.

THE word meerschaum is from the German, MEER, the sea, and SCHAUM, foam; on account of the original belief that it was obtained from sea foam. Sepiolite, its recent scientific name, is derived from the Greek word, SEPIA, cuttlefish, the bone of which is light and porous, and also obtained from the sea.

Meerschaum is a soft, opaque and compact mineral, with a smooth feeling and a fine earthy texture, resembling

clay or kaolin. It is light—in dry masses, floating on water—with a white or grayish-white color, or with a faint yellowish or reddish tinge. When first dug from the earth, it is soft, with a greasy feeling, and lathers like soap; and on this account it is said to have been used by the Tartars in washing their linen.

The composition of meerschaum, by a chemical analysis, is found to be: silica, 60-8; magnesia, 27-1; water, 12-1; although the amount of water usually varies in different specimens.

The following are certain and simple tests for the mineral: Wet a piece of meerschaum with the tongue, then cut off a very thin slice with a sharp knife, when it will curl into a perfect shaving. Proceed similarly with a lump of clay, and it falls off as dust. Touch the tongue to the surface of meerschaum, it will adhere strongly to it, which it will not do to either kaolin or clay. If a small piece of the mineral be placed under the microscope, it will show that it is composed of very minute cockleshells, twisted and matted together into a solid mass. When heated in a glass tube it yields water and gives out a fetid odor. With a cobalt solution it gives a pink color on ignition, and is decomposed by hydrochloric acid with gelatinization.

Most of the meerschaum of the world is obtained in the stratified alluvial deposits, at the plains of Eschi Shehr, in Asia Minor, where it is found about fifty

feet under ground. Here the Turks have mined it for many centuries, keeping its production a profound secret, never having allowed even a single Christian to visit the mines, and but few of their own race. When the mineral is taken from the mine it has considerable foreign matter attached to and mingled with it. This extraneous matter is carefully cut away, leaving only the pure material in many peculiar and fantastic shapes. As the trimming process proceeds, the workman rubs it with a thick oily leaf, which gives it a fine polish for the market. Sepiolite is also found in Greece, in Morocco, and at Vallecas, in Spain.

Meerschaum is not sold by weight but by quality; its value being determined by its lightness and the size of the pieces. It is disposed of by the box, the price varying according to the size and quality of the mineral. The boxes are usually three feet in length, twenty inches wide, and twelve inches high, and the contents of each is valued at from fifty to three hundred dollars. The consumption in the United States is about 1100 boxes annually, although some years this amount is much exceeded; as in the year 1880, when more than 1500 chests were used. It is employed almost entirely in the manufacture of pipes and cigar-holders, although it could be employed in the production of many other useful and handsome ornaments. After finishing the bowl of the pipe it is dipped in boiling wax, to fill the pores of the exterior, thus arresting the evaporation of the oil from the tobacco and retaining it near the surface, whence the rich color for which meerschaum is famous.

No deposit of meerschaum has been discovered on the American continent;

but there are good reasons to believe that it may yet be found in this country. Every assayer and mineralogist, in mineral bearing sections of our country, has sent to him fine specimens of clay and kaolin, with the inquiry: "Are they meerschaum?" It is well to continue the search, for if successful, an American mine would undoubtedly yield the discoverer a fortune.

Meerschaum, or sepiolite, has occasionally been observed in the United States, but only in a few isolated places; though they were of a good quality. Specimens were discovered in Chester and Delaware counties, Pennsylvania; at the Cheever iron mine, Richmond, Massachusetts; and in the serpentine rocks at New Rochelle, West Chester county, New York.

Hummingbirds.

BY G. D. STORY, CARTERVILLE, MO.

Next to the paradise bird in splendor, if not equal to it, comes the fairy little hummingbird, which Audubon described as the "glittering fragment of a rainbow." This feathered firefly, the jewel of the woods, is very common both in North and South America. Its tongue is a long tube, through which the little fellow can draw the contents of each flower chalice as well as the bee, with which, indeed, the little hummer must sometimes fight for the mastery.

There are about seventy species of these birds in our western world, and the early navigators and adventurers, who penetrated to the tropics, wrote home the most extravagant and delightful descriptions of these wonderful little creatures, as they saw them hovering above the flowering masses or nestling

amid the petals of the splendid orchids, not a whit more beautiful than themselves. The tribes of the West Indies and American mainland called them by various names, such as "shooting-stars," "will-o'-the-wisps," etc., and wore head-ornaments, bracelets, girdles, mantles, and beautiful pictures, superior in softness of sheene and variety of tint to the richest mosaic, out of the tiny feathers.

In some parts of South America they swarm so thickly in the trees that they might be almost mistaken for brilliant swarming wasps. But the curious traveler only needs to look a littler farther to find the Liliputian nests, no larger than a cloven walnut; suspended to the dancing twig of some wild orange, tamarind, or other small tree. The tiny egg looks like blanched peas in a mossy pod. The nest might be mistaken for a bud on the bough, but, by and by, glittering little green heads and crimson gorgets that peep over the side tell a different story.

The flight of these birds is inconceivably rapid—so rapid, indeed, that the eye cannot follow it when the full speed is put forth; and with such wonderful rapidity do the little sharp-cut wings beat the air that their form is quite lost, and while the bird is hovering near a single spot the wings look like two filmy green fans attached to the sides. While darting from one flower to another, the bird can hardly be seen at all, as it seems to come suddenly into existence at some spot, and as suddenly to vanish from sight. Some hummingbirds are fond of towering to a great height in the air, and descending from thence to their nests or to feed, while others keep near the ground, and are seldom seen at an elevation of many yards.

The food of the hummingbird is much

the same as that of the honey-sucker, except, perhaps, that they consume more honey and less flies. Still they are extremely fond of small insects, and if kept away from this kind of diet, soon pine away in spite of unlimited supplies of syrup and other sweet food.

The Ruby-throat is a variety most familiar to us, and never attain a length of more than three and a quarter inches. The throat of the male bird has a ruby-colored gorget, shading off into deep black and then to fiery crimson and burnished orange. The female bird, it is hardly necessary to say, is always dressed in more sober colors.

This little fairy bird, in spite of his courage, is sometimes driven from its pleasant pastures by the humble-bee, whose sting is too much for the other's long bill; and yet the little fellow is daring even to rashness. His shape indicates a small stomach, a large brain, and a bigger heart.

Charievoix, the French naturalist, relates that he had seen two hummingbirds fighting with a crow, and by their inconceivably swift motion and long needle-like bill actually succeeded in killing their antagonist. Hummingbirds in many cases have been tamed, and become much attached to their mistresses, learning to alight on the finger and sip sugar-water presented in the calyx of a flower. But they crave something more than sweet juices, and range through the air in search of insects. There is one insect—the great black spider of South America—which retaliates and hunts the hummingbird as a dainty tidbit. But the little bird has an ally and avenger in the big-headed South American ant, which hunts the black spider and mercilessly destroys him.

The Pine Grosbeak.

(PINICOLA ENUCLEATOR).

BY F. C. LUSK, HOLLEY, N. Y.

The Pine Grosbeak, one of the largest of the family of finches, is a resident of the northern latitudes, only making us winter visitations as the severity of the season urge. They usually appear in small flocks, though instances are on record where flocks have been so large as to appear almost phenomenal. During the winter and spring of 1884, as late as April 10th, they were very plentiful, probably owing to the severity of the season in the more northern sections. The apparent fearlessness of this bird is one of its most notable characteristics; they evince no fear of man, and may be so closely approached as to render their capture easy, even with snares or nets. The song of this bird is generally a low, plaintive warble, audible but a short distance, although they sometimes sing in a louder note, resembling somewhat that of the Rose-breasted Grosbeak. Both the male and female sing, the former much louder and more melodious than the later. During flight, they make a whistling sound, said to be produced by their wings. The Pine Grosbeak is a robust, thick-set and rather clumsy looking bird of about eight and one-half inches in length; they vary somewhat in size, however. The plumage of the adult male is of a rich carmine red, fading into white on the abdomen, and streaked with blackish-brown on the back. The wings and tail are dusky, with white margins, the former having two white cross-bars. The bill and feet are black. The female is of an ashy-gray above, blending into a paler hue below,

and marked with brownish-yellow on the head and rump. The bill is very stout, and convex in all its outlines; the tip of the upper mandible overhanging that of the lower. The tail is about four inches in length; bill, one-half inch; and tarsus ninety one-hundredths of an inch. Comparatively little is known of the nesting habits of this bird. The eggs are of a pale bluish-gray color, thickly spotted at the larger end with reddish-brown, and elsewhere sparingly sprinkled with the same color and a few spots of a darker hue. They average about .95 by .65 in size.

Surface Finds.

BY W. M. BEAUCHAMP, D. D., BALDWINVILLE, N. Y.

The young archaeologist is likely to content himself with what he finds on the surface, and yet wishes to know what his relics are. Generally his best field for work will be by some stream or river, or near a lake shore, but there are forts and village sites in New York at a sight from these. If he is north of the great limestone ledge, in which occurs the carboniferous limestone, the smallest flint chip will indicate Indian antiquities; south of that formation this would be no indication at all. The burnt soil, fragments of soapstone, brown earthen ware, and the rifts in rivers, will often help him in choosing his ground.

Arrow and spear points he will readily recognize, but that which he might neglect as broken may prove to be a fine knife or scraper. The rarest arrow I have, I had passed by as broken, but turned back to make sure of it. Many curious scrapers are thus overlooked, being often made from the bases of

broken arrows. These scrapers are of many forms, the characteristic features being the neatly beveled edge, and the flat under surface.

He may find in New York that form of stone axe known as the sett or deer-skiner, rough or finely polished, and somewhat like a stone chisel in form. In that State he is not likely to get the grooved stone axe, unless in the southern part. In other States these are frequent. Gouges he may find; flat and broad, long and neatly hollowed, picked or polished, and rarely with a groove across the back.

Pestles may be square or cylindrical, from six inches to over two feet in length, and are often simply sandstone pebbles, flattened by grinding on one or both sides. Small oval pebbles may be mul-lers, having one or both surfaces ground flat; or they may be hammer-stones, with indentations on one or both sides; or sinkers, with notches at the edges. There is an endless variety of things of this kind.

If he is fortunate, he may find a stone tube, neatly drilled from end to end; or a flat stone with perforations, sometimes called a gorget; or a perforated banner-stone, varying from the form of a pick-axe to that of a butterfly. The relic may be boat-shaped, or like a reel, a plummet, a cup, a bird-like form with or without projecting ears, and many other odd shapes. Some of these are quite likely to be of a green striped slate, or other ornamental stone. In one or two parts of New York he may find some large, thin, polished slate arrows or knives, much like the blade of a jackknife, but broader, and sharp on both edges. These are rare.

A slender flint drill he may mistake for a broken arrow, if it is one of those

without a distinct base; but sometimes these are notched like an arrow, or expand so as to appear like a gimlet.

The surface will yield only fragments of earthenware, with lines, dots and projections, often very pretty; but he may chance to get a clay pipe, and perhaps one curious in form. I have figured one from Onondaga county which has fourteen human faces on what remains of it. In New York, clay pipes are often older than those of stone.

Near the rivers he is quite likely to see fragments of soapstone vessels, with carved handles. Happy is he if he finds an implement of native copper, of which I have figured many arrows, spears, gouges, sinkers, beads and celts. The largest I have met with here is the straight celt, nearly three pounds in weight. The native copper implements are traversed by irregular longitudinal ridges; those introduced by the whites are smooth.

If the young collector desires knowledge rather than pretty things, he will examine all forms that he finds, for than he will acquire some idea of the general character and occupation of those who have now passed away.

A California Vampire Bat.

The Los Angeles Herald describes a specimen of the vampire family recently discovered there: "This huge specimen measured twenty inches from tip to tip of his wings, and was pretty well armed with teeth and claws. His head was as large as four or five ordinary bat heads combined, and well hooded with two ears fully as large as a half-dollar. His majesty was as vicious and warlike as a scorpion or tarantula when confined, and his bite would probably be as dangerous.

Some Stories About Ants.

 BY W. R. LIGHTON, CRESTON, IOWA.

As much as ants have been studied and as much as has been written concerning them by the world's closest observers and greatest naturalists, there still remains something to be told.

Wonderful as the physical characteristics are, still more wonderful are the social and mental tendencies, and it is with these portions of their history that my stories have to do.

Many of those who have written of their observations,—notably, Sir John Lubbock—are led to announce that although the ant is endowed with a really remarkable degree of intelligence, this has been greatly exaggerated in the popular mind, and in Lubbock's work, "Ants, Bees and Wasps," there are collected together very many of the author's experiments and experiences which are given in support of his opinion.

Wide and general reading and correspondence and close personal attention to our little friends themselves has not, I must confess, in any measure upset this idea of their ability in my mind. Upon the contrary, as summer after summer passes, and fact is added to fact in my collection of notes, I find myself becoming more and more persuaded that my belief is well founded and that Sir John's reasoning and assumptions are, to a considerable extent, unwarranted and erroneous. I have upon foot a series of experiments suggested last summer, the result of which I hope to be able to make known before the elapse of another year.

Three years ago the garden around my home was especially prolific with the small domes of the red garden-ant (which is our most common species here) and

one morning, stretched at full length upon the ground amongst these domiciles, magnifying glass in hand, I saw a display of intelligence which was, I think, most convincing.

One of the working ants of a certain colony was out upon a prospecting and foraging expedition, poking and prying into every hole and corner, under every grass blade and clover leaf in search of provender or a fight—it didn't appear to care much which—when it ran fairly against the dead body of a small black ground-beetle of about ten times its own weight, as I should judge.

This discovery appeared to excite the little prospector immensely, for it described a series of eccentric circles very rapidly around the beetle, waving its antennæ wildly in the air, and then suddenly, as through inspiration, it seized hold of one of the legs of the beetle with its strong little jaws* and started to struggle courageously back to its nest with its heavy and unwieldy load.

It was a by no means easy task, but the persevering energy of the little worker told, and at length the nest was reached, but upon attempting to convey the prize inside it was found to be a physical impossibility because of the rigidly outspread legs. Here was a pretty situation, to be sure, and the little imp appeared to be utterly confounded and perplexed, but with dauntless and truly American spirit it soon set to work as though bound to overcome any and all obstacles. It went just inside of the opening of the hill and pulled, then came outside and pushed, twisting and turning this way and that, straining every muscle to the highest tension, but it was of no use, the legs would not yield.

*It is stated that an ant can carry fifteen times its own weight.

Again the small worker paused and was disposed to argue the question with his victim, so obstinate even in death.

"Do you suppose I am going to carry you clear home and then abandon you in this way? Well, I won't do it, you obstinate creature. You're a beetle, but you're a dead one, and I'm an ant, and a very live one, and inside that hole you go."

Then a bright idea seemed to occur, for abandoning its attitude of perplexed defiance, it darted into the nest, and in the course of a minute or so it emerged, having with it, and apparently under its supervision, a command of six or eight other workers. These conferred together, ran around and around, gesticulating violently with their antennæ, and then what should they do but set to work and bite off all of the legs of the beetle and bear its body into their hole amidst great triumph and rejoicing.

One day soon after, I found a small white grub, probably about one-third of an inch in length, and placed it upon the ground near this same nest. Pretty soon an ant ran against it, killed it almost instantly by a sharp bite near the head, and then tried to carry it back to the hill, but the load was too great and would not be moved.

After finally satisfying itself that its own efforts were unavailing, the small butcher abandoned the fruitless attempt and started to return to its place of abode to procure help. Upon the way it encountered a fellow inhabitant of its hill, and each, halting, tapped the other vigorously upon the back with its antennæ, seemingly in the interchange of ideas, for both immediately went to the grub, and together were able to secure it.

The indisputable ability of ants to communicate with each other is one of


the most interesting and 'fruitful of the several branches of study connected with the queer little fellows. Just how this communication is carried on is disputed. The theory that it is by means of a telegraphic system of taps of the antennæ is, to say the least, time honored, and if that were a sufficient indorsement in itself, this idea would of necessity lead all others. Scientists, however,—scientists more than naturalists—have a peculiar habit of refusing to accept ideas of any kind simply because such ideas can boast of a pedigree extending back for a long period of time. The idea and the circumstances attendant upon its formation must be inquired into.

Altogether, though, it appears to the writer that this proposition is the most acceptable. I do not mean that there is a regular formulated alphabet of signs after the style of the human "deaf and dumb" language, but a system constructed upon the same plan, though in a much more crude condition, being only so far advanced as to enable the communicants to convey and grasp general propositions, and not sufficiently extensive to allow of their going into the finer details of conversational science or to empower them to comprehend the minutiae of a closely connected chain of logic.

So far as is known, the vocal organs of ants are not so far developed as to permit of the utterance of distinct sounds.

TO BE CONTINUED.

What is said to be the largest specimen of the century plant in existence is in Kenosha, Wis. It is about twenty feet in diameter, the leaves being from eight to eleven feet long.

 Subscribe immediately!

The Mound-Builders.

BY HARRY F. THOMPSON.

The origin and the makers of mounds has ever been a question of great importance to archæologists, and still remains clouded.

Many theories,—in fact too many—have been advanced. Each new theory causes discussion. It is universally believed that there are mounds whose makers were members of an extinct race of men, and there are also mounds whose makers belong to what we call Indians. In fact, the mounds erected by the latter are too often attributed to the former, but very seldom the reverse.

Several years since, Dr. Metz, who has done some remarkable work for the Peabody Institute, in the exploration of mounds in Ohio, opened a mound near Reading, Hamilton county, Ohio, which was found to be stratified, and built over four circular “pockets.” Why so built, is another question that arises, as to the origin and purpose of the mounds.

These stratified mounds are undoubtedly the work of an older and greatly different race of people than what we term Indians, for, as Mr. S. T. Walker says, in the Smithsonian report for 1883, “We must remember their inadaptability to concerted and continued effort.” He further says, “For if the large mounds were the gradual growth of ages, and varied by successive additions, by many generations, we can readily understand and accept the theory of their being the work of the modern Indian.”

But we must first prove whether or not they are “the gradual growth of ages.”

We do not desire to advance any

theory, but only wish to say, that owing to the rapidity, and in some cases uncalled for, of wholesale destruction of mounds, that some proper solution must soon be reached or the question be gone forever unsolved, unless the States buy in, for future investigation, noted works of archæology.

Long-billed Marsh Wren.

Large numbers of these birds nest on the salt meadows of Long Island. They prefer a low bush, but sometimes build in meadow grass. The nest, made of coarse sedges, etc., firmly interwoven, cemented together, and lined with soft stuffs, is not exactly spherical, but longer in its perpendicular diameter. It is usually fastened to the bush or grasses firmly, about three feet from the ground or water, as the case may be. It has one hole in the side for entrance and exit, and usually does not have any preceptible projecting edge over the hole. Of more than three hundred nests examined, not more than ten had the projecting edge; six were double, (i. e., one connected above the other;) two had the holes in the sides; and one had the hole in the top, all containing eggs. The usual number of eggs is four or five. Of over three hundred eggs collected, all were in sets of four or five, except one set of six, and two of three. When the eggs are laid they are covered with a bunch of fine grass, when the bird leaves the nest of her own accord. When she is in the nest the grass nearly fills the entrance. They lay from the early part of June to the last of July, and while some nests contain young birds others are not completed.—OOLOGIST.

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CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

ASSOCIATE EDITOR,

H. F. Thompson, Indianapolis, Ind.

RANDOM NOTES.

W. L. Brenholtz, Mt. Pleasant, Iowa, has our sincere thanks for a number of excellent fossils.

We would like our readers to send in a few more short articles, as we are greatly in need of them. We have plenty of serials.

Prof. Davie states that the second edition of his Check-List is nearly exhausted. Those intending to purchase should send in their orders at once, before it is too late.

In South America a plant has been discovered which possesses electrical properties. Birds and insects always avoid it.

Birds have multiple stomachs, of which the crop is one part and the gizzard another, the true digestive stomach being another. The food is macerated in the crop, ground to pulp in the gizzard, and then digested in the stomach.

Beginning with the next issue, we shall advance the subscription rate of this magazine from 35 to 50 cents. Persons wishing to subscribe or renew while the price is lowest should forward their subscriptions at once.

The first snow of the season occurred at this place at 8:55 A. M., Oct. 1st. Its first occurrence in 1885 was at 11:30 A. M., Oct. 6; in 1884, 10 A. M., Oct. 23d. According to this it seems as though the winters were getting earlier each year.

Mr. Fred C. Lusk, of Holley, N. Y., the gentleman who recently inserted a page advertisement in the COMPANION, says that it paid him far beyond his expectations, and that he would advise all parties desiring to secure a good trade to place an advertisement in our journal.

At the recent fair of the Brockport Union Agricultural Society, Mr. M. Cook, of this place, exhibited a very fine collection of taxidermy specimens, including foxes, raccoons, squirrels, owls, warblers, a large sand-hill crane, peacock, etc., etc.

We have just received from Mr. Chas. H. Marsh, of San Diego, Cal., some very fine bird-skins, including one of the Road-runner, a very curiously shaped bird and a valuable acquisition to our collection. We would advise parties desiring California skins to deal with Mr. Marsh.

A Visit to a Copper Mine.

BY J. E. J.

Saturday, May 15th, dawned clear and cool, and found myself, in company with a friend, speeding along toward the copper regions of Northern New Hampshire, on our long planned and looked for collecting trip. After a ride of perhaps a dozen miles through some of the most beautiful scenery in New England, and catching glimpses here and there of the familiar White Mountain range and snow-capped Mt. Washington, we at length emerged into the little valley of the Connecticut, and there at our feet, tossing hither and yonder, lay the turbulent stream which divides the old Granite State from her sister State, Vermont. After paying the customary toll fee, we began the ascent of a long range of hills which, had there been less sand, would have been more comfortable both for man and beast, and which separated us from our destination.

The principal mine, known as the Little Mine, is situated near the crest of a steep and rocky mountain range, rendering it very difficult to walk, much less to ride. We stabled our team at the barn of a friendly farmer, and after over an hour's hard climbing over something less than three miles of rocks, we came in view of the mouth of the mine. The ore was considered so rich and paying that about two years since a company was organized to work it. Machinery was transported thither and a building erected. A shaft was sunk to a depth of some two-hundred feet, but the cost of transporting the ore was so great and difficult that after a few months they were compelled to stop work. Were it not for this fact and the situation of the

mine, it could, in all probabilities, be very profitably worked.

We found, much to our regret, that the shaft was flooded so that it was impossible to descend, but procured some very fine and showy specimens at the mouth. These specimens showed a very rich percentage of copper, and are the handsomest for the cabinet ever produced, the clear purple blended with the copper plates making it unusually attractive.

After carrying our specimens back to the house, we were well prepared for the hearty meal which the matron of the establishment had very considerably placed before us. We had intended to visit several other localities, but as we observed indications of rain and were desirous of reaching home before dark, we were obliged to forego the pleasure of the trip until a later day. We reached home about tea time, well satisfied with our day's trip and a quantity of fine specimens.

Discouragements.

Some writer has affirmed that the proper study of mankind is man. A more comprehensive statement, and one equally true, is that the proper study of mankind is nature, of which man forms a part.


The utilitarianism of the present day, is the bane of natural science. The study of nature for the love of it, is so out of harmony with our nineteenth century American civilization, that the latter, instead of a help, is often a hindrance to it. The average American regards as good for nothing that which does not possess a market value that can be expressed in dollars and cents. The young man who stands behind the dry goods

counter, thinking of nothing but the profits of trade, and hoarding up his wages for the establishment of himself in business, or who contentedly follows the plow or wields the spade, with no other ambition than to sometime become himself the owner of a valuable estate, is a model of wisdom and prudence; the one who climbs out of the rut of common pursuits, and gives reign to the better instincts of his nature, reveling in the luxury of communion with that immense and measureless collection of wonderful and beautiful things that constitutes the world he lives in, is a crank or a fool. To get bread and money, is the only legitimate object for the employment of our faculties. The youth who is inclined to spend valuable time in a practical study of natural history, in preference to mastering the details of some manual labor pursuit, subjects himself to parental reproof. He who goes about with a hammer knocking rocks to pieces, in search of some hidden record of creation, or dips up from the muddy waters of the road-side ditch the tiny shell that testifies of the Creator's art, is an object for the pitying sneer of the gaping multitude.

Nor when we come to the public schools is the matter helped much. The idea of the popular educators of the present day, is the formation of a so-called symmetrical, well-balanced character. There must be just so much grammar and mathematics, just so much botany and zoology, and no more. The course of study in a given case is not arranged with reference to the natural ability and taste of the pupil, but his ability and taste must conform to the established, inflexible standard. He may be but a few grades removed from an idiot in his ability to master arith-

metic, but especially capable in grammar; nevertheless he must not advance in grammar beyond the land-mark established for his class, till his deficiencies in arithmetic have been made up. The youth with a mind which, with proper encouragement and cultivation would place him in an honored position as a student of some branch of natural history, is persistently held back for lack of proficiency in some other branch of study for which he has neither ability nor inclination. However, the signs of the times, as seen in the recent multiplication of schools in which special courses of study are allowed, point to a better state of things.—SCIENCE MONTHLY.

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Curiosities of Howe's Cave.

BY G. E. WELLS, AMES, N. Y.

This wonderful cavern is situated in Schohorrie county, New York, and is one of the greatest natural curiosities in the United States, being second in size and interest to Mammoth Cave, Kentucky. In 1842, Lester Howe was hunting foxes near the present mouth of the cave, when he stepped into a hole which to him seemed to have no bottom. He explored further and found the hole was about eighteen feet deep, and led into this wonderful cavern. The most striking feature is the wonderful deposits of carbonate of lime, producing thousands of beautiful stalactites and stalagmites of fantastic shapes. Let us enter the cave and examine some of its wonders. A short distance from the entrance brings us to the Reception Room, some forty feet wide and fifteen feet high; the walls and floor ornamented with stalagmites and stalactites. Near by, up an ascending path, we find another large room, called the Bridal Chamber, in which a stalagmite forms a natural altar. This room is ornamented with a circular dome, so high that the light of the torch does not render the top of it visible. On we go, and next come to Washington Hall, about twenty-five feet high. In this hall are two stalactites, call Washington's Epaulette and Lady Washington's Hood.

Farther on we reach the Giant's Chapel, a magnificent chamber about fifty feet in height. The guide points out the vast room. We now hasten on and are soon in the Straight and Narrow Way, four or five feet wide at the bottom, while at the top there was just room for a person's head to pass through. Leav-

ing this, we pass several Stalagmites of fantastic shapes, and our guide points out side entrances to two or three branches of the cave not thoroughly explored. We are also shown a pit said to be bottomless. We have long since passed out of hearing of all noise of the outside world; but now a strange unearthly sound comes from the depths beyond. What is it? Soon the mystery is explained. Here is a pool of water which comes down a gentle incline, and forming a whirlpool, disappears in some cavity below. The Pool of Siloom, this is called.

We are now about one mile from the entrance, and come to what is called Crystal Lake, about one-quarter of a mile in length, about sixteen feet in depth, and perfectly transparent, the bottom being seen by the light of our torches. At the head and near the foot of the lake are huge stalagmites; the one at the head being thirty feet in diameter. The cove to this point is lighted with gas. Stalactites hanging from the roof like icicles, reflect our lights as we are ferried over the lake, and we find many objects of beauty, of which we cannot stop to mention. One of the most interesting of these stalactites is called the Giant's Spectacles, having a striking resemblance to a huge pair of eye-glasses. Others are known as the Owl, Elephant's Ear, Lady of the Lake, (her face turned modestly to the wall,) Civen's Rider, Old Church Organ, Old-fashioned Pulpit, etc. All of these are wonderfully suggestive of the names they have received.

TO BE CONTINUED.

Parties in want of handsome cabinet specimens should, first of all, buy a box of those handsome Herkimer county "diamonds" of A. B. Crim. See advt.

Bird-killing Sparrows.

So much has been said of late for and against the English sparrow that the following may be interesting as evidence:

Quite recently, upon the Capitol grounds, a sparrow was observed in the act of slowly killing a hummingbird. When discovered, it had seized the struggling victim in its talons, and was picking it vigorously about the head. Whenever disturbed, it caught the neck of its fluttering prey in its bill, and, after flying a few feet, alighted and renewed its bloody work. Soon the first sparrow was joined by another, and then the scene of murder was carried into a copse beyond the reach of observation.

To those who attribute the destruction of our American birds entirely to the demand for wings for ladies' hats, as well as to those who deny the quarrelsome habits of the sparrow, this piece of information may be of value.—H. L. BRAGG, Turnbridge, Vt.

Habits of the Scorpion.

A NATURALIST GIVES SOME CURIOUS ILLUSTRATIONS OF THEIR LIFE.

A writer in *LAND AND WATER* relates his experience with scorpions as follows: A few years ago, while in the island of Jamaica, it was my fortunate chance to have an opportunity for observing some very curious facts in connection with that genus of the Arachnida class commonly known as the scorpion, and the curious traits of character in these insects. Turning over some old papers in my office one day, I suddenly came upon a large black scorpion, who promptly tried to beat a precipitate retreat. Having read or heard somewhere that if

you blow on a scorpion he will not move, I tried the experiment, and was greatly astonished to find that it had the desired effect. The scorpion stopped instantly, flattened himself close to the paper on which he had been running, and had all the appearance of "holding on for dear life." While I continued to blow even quite lightly he refused to move, though I pushed him with a pencil and shook the paper to which he clung so tenaciously. Directly I ceased blowing, he advanced cautiously, only to stop again at the slightest breath. I was thus able to secure him in a glass tumbler which happened to be within reach, and then I determined to try another experiment as to the suicidal tendencies which I had heard ran in the veins of the Pedipalpi family.

On the stone floor of the kitchen attached to my office, I arranged a circle of burning sticks about three yards in circumference, the sticks being so placed that there were no means of exit through the fire. It was not intense, but small and quite bearable as regards heat within a few inches, so that the central part of the circle was perfectly cool. Into this center I accordingly dropped my scorpion, who, on touching terra firma, darted off in a great hurry, only to be quickly brought to a halt on reaching within a few inches of the periphery of the circle. After a short pause of reflection he deviated to the right, and ran once completely round the circle as near to the fire-sticks as it was prudent to venture. This he did three times, often approaching the burning sticks quite closely in his anxious endeavors to escape. In about a quarter of an hour, finding that his efforts were useless, he retired almost into the exact center of the circle, and there in a trag-

ic manner raised his tail till the sting or spur was close to his head, gave himself two deliberate prods in the back of the neck, and thus miserable perished by his own hand. As I placed the body of the suicide in a bottle of spirits, I almost regretted that I had not let him escape beford he had resorted to such an extreme measure.

My last experience is even more curious than the preceding, and it shows a remarkable provision of nature that is almost incredible. All I have ever read on this point is contained in the following words: "The young scorpions are produced at various intervals, and are carried by the parent for several days upon her back, during which time she never leaves her retreat." I was playing a game of billiards in a small village in the Blue Mountains; there was no ceiling to the room, the roof being covered, as is the custom in Jamaica, with cedar wood shingles. My opponent was smoking a large pipe, and suddenly, just as I was about to play a stroke, what I thought was the contents of my friend's pipe fell on the table close to the ball at which I was aiming. Instinctively I was on the point of brushing it off with my hand, when, to my amasement, I saw it was a moving mass, which, on closer inspection, turned out to be a very large female scorpion, from which ran away in every direction a number of perfectly formed little scorpions about a quarter of an inch in length. The mother scorpion lay dying upon the billiard cloth, and soon ended her feeble struggles, the whole of her back eaten out by her own offspring, of which, as they could not escape over the raised edge of the billiard table, we killed the astonishing number of thirty-eight. They had not only been carried by their

parent, but they had lived on her, cleaning out her body from the shell of her back, so that she looked like an inverted cooked crab, from which the edible portions have been removed. She had clung to her retreat in the shingled roof until near the approach of death, when she had fallen and given us this curious spectacle. I was told by the attendant that the young scorpions always live thus at the expense of their mother's life, and that by the time her strength is exhausted, the horrid offspring are ready to shift for themselves.

An Amusing Scientific Excursion.

'Tis thirty years since, and more too.

Samuel M. Felton was the leader of the party, which comprised, among others, C. C. Felton, John P. Felton, Thos. Hill, Arnold Guyot, Louis Agassiz, Benjamin Peirce and Alexander Agassiz, then a boy, not knowing a word of English, and armed with a muslin bag on the end of a pole, to catch butterflies, with which, boy as he was, he was quite well acquainted.

While we waited at South Acton for an express train, Agassiz saw a butterfly, and having no net himself, called, "Alexe ! vite ! un beau papillon !" and the game was soon bagged. A moment afterward, S. M. Felton kicked over a large chip, and saw a huge beetle under it. Thinking it might be valuable, he called to the boy, "Alexe ! beau papillon !" When the lad came up, his merry laugh at finding a beetle called a fine butterfly was infectious, and none laughed more heartily than the misnomer. From this moment "un beau papiillon" was the watchword of the party ; and every living thing which we thought Agassiz could possibly like to take to

his "toad factory of the Charles," as his incipient museum was named, in as good French as we could muster, a fine butterfly.

We came to Bethlehem, N. H., and in going up a long hill, approaching from Littleton, we all got out and walked, except C. C. Felton, who remained with the driver on the box. As we walked up the hill, running here and there, sweeping with the muslin net, turning over logs and stones, pouncing on frogs, etc., the driver said to Professor Felton, "Who are these men you have with you?" "Oh," replied he, "they are a set of naturalists from an institute near Boston."

In the stage was a man not of our party. He walked solemnly up the hill in front of us; he had preserved from his entrance into the stage a dozen miles back, a profound silence, and a very austere countenance, mingled with melancholy. Suddenly he was observed to take off his hat, make various fantic swoops there-with, and finally, as the butterfly rose over a clump of tall alders, he sprang high in the air after it, making a last desperate swoop with his hat, and screaming for the first time the watchword, "Beau papillon!" at the top of his lungs and top of his compass. At that moment the down stage met ours, and as they passed they both stopped an instant. The other driver gazed down the hill in astonishment, and said, "What sort of a lively freight have you there?" Our driver, leaning over, answered in a loud confidential whisper, "They are a sort of naturals from the asylum near Boston; their keeper just told me so."

The next day Peirce and Agassiz were together on the shores of Echo Lake; the latter had borrowed his boy's net, and

was interested to catch a particular species of dragon-fly. The two friends had separated a few paces, when Peirce saw one of the coveted dragon-flies, and in his eagerness to have it secured, called it by the name which he had always heard it called in his boyhood: "Here, Agassiz! here's one of those 'devil's-needles.' " At that moment he became aware that the melancholy man of the day before was close behind him. The austere man, as if to rebuke Peirce for using a word bordering in his mind on profanity, asked, in the most solemn and deliberate manner, "Sir, can you tell me the proper botanical designation of that insect?"

And for the rest of the time that our party was together we could not say "proper name," or "real name,"—the fascinating absurdity of "botanical designation" was applied to every kind of subject or object.—REGISTER.

Our next issue will be finely illustrated.

We will send 100 sheets of unruled writing paper post-paid for 25c.

This paper and the *Young Naturalist's Journal* both one year for 50 cents.

We can supply all back numbers of this paper, excepting Nos. 1, 3, 10, and 11, at five cents each.

We have receive several copies of the "*Auk*," the leading ornithological journal in this country, and cannot praise it too highly.

A new discovery is that by the simple use of citric acid or citrat of silver, sea water may be made drinkable. By this means chloride of silver is precipitated, and a harmless mineral water is produced. An ounce of citrate makes a half-pint of water drinkable.

CORRESPONDENCE.

—
CONTINUED FROM LAST ISSUE.

May 20—Three sets of Spotted Sandpiper.

May 25—One set of Whip-poor-will and two sets of Spotted Sandpiper.

May 26—Two sets of Yellow-breasted Chat.

May 28—One set of Arcadian Flycatcher, one set Scarlet Tanager, one each of the Black and the Yellow-billed Cuckoo.

June 5—One set of Cedar Waxwing, two sets of Wood Pewee.

June 6—Two sets of Spotted Sandpiper, one set of Red-headed Woodpecker, two sets of Baltimore Oriole, one set each of Orchard Oriole, Bank Swallow, Barn Swallow, and Indigo Bunting.

Spotted Sandpipers very abundant and Belted Kingfishers very rare here this season.

The farmers are killing off the hawks and owls, there being a premium price of fifty cents paid for each scalp.

J. W. JACOBS, Waynesburg, Penn.

We wish our readers would take more interest in this department and contribute short notes of interest.

EXCHANGES.

—
THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

G. B. HOLMES, Fernwood, Ills.—A 10 gauge shot-gun paper shell crimper to exchange for a 12 gauge crimper.

NAT S. HOSFORD, Jackson, Tenn.—I have a new single barrel muzzle-loading gun to exchange for the best offer in birds' eggs.

J. W. JACOBS, Waynesburg, Pa.—Arrowheads, printing press (chase $2\frac{1}{2} \times 3\frac{1}{2}$), and birds' eggs, for birds' eggs, or naturalist's papers and magazines. Send lists and receive mine in return.

H. F. THOMPSON, Indianapolis, Ind.—Confederate bonds wanted for private collection. Write what you have. Also wanted First Annual Ethnological Report. Best of exchange given.

FRANK BOLL, 25 Costar St., Rochester, N. Y.—Davie's Check List, Vol. Young Oologist, one number Century, 75 foreign stamps, and 7 numbers Stamp and Coin Gazette, for modern coins or offers in half-cents.

WARREN K. MOOREHEAD, 200 Main St., Cincinnati, Ohio.—Valuable fossils, ores, shells, sea relics, war relics, minerals, agates, polished gems, Indian relics of all kinds, for offers. Send stamp for reply. Send lists of what you have. I prefer mound relics.

QUERIES AND ANSWERS.

J. S., JR., Reading, Pa.—Agassiz was born May 28th, 1807, and died December 14th, 1873.

S. T. E., Galveston, Tex.—See reply to Mrs. L. A., in Vol. II, No. 1.

We have several specimens awaiting identification, which as yet we have been unable to identify.

—
We will print your name, address and business on 100 good envelopes and send post-paid for only 40 cents, silver.

The NATURALISTS' COMPANION and Davie's Egg Check List (second edition) for only \$1.00—the price of the Check List alone. This offer holds good until November 1st.

The Naturalists' Companion.

"Whosoever the Naturalist turns his eye, life or the germ of life lies spread before him."--Humboldt.

50 Cents per
Annum.

CHARLES P. GUELF,
EDITOR AND PUBLISHER.

Single Copy,
5 Cents.

VOL. II.

BROCKPORT, N. Y., OCTOBER, 1886.

NO. 3.

THE BUTTERFLY.

Behold, ye pilgrims of this earth, behold!
See all, but man, with unearned pleasure
gay;
See her bright robes the butterfly unfold,
Broke from her wintry tomb in time of
May.

What youthful bride could equal her array?
Who can with her for easy pleasure vie?
From mead to mead with gentle wing to
stray,
From flower to flower on balmy gales to
fly,
Is all she hath to do beneath the radiant
sky.

—Science Series.

Wild Flowers under Cultivation.

BY GEO. E. BRIGGS, PEEKSKILL, N. Y.

VERY few cultivators of plants realize the beauty and fragrance of some of our native plants. Those who have experimented in cultivating wild flowers, universally agree that many may be grown in our gardens or green-houses, and are as ornamental as some of our rare and delicate foreign plants.

I have spent much time and labor in testing the hardiness of many of our wild plants, and can give the following as some of the results of my investigations.

One of the most gorgeous of our late swamp plants is the Cardinal flower, (*Lobelia cardinalis*). In August its long spikes of beautiful cardinal flowers may be seen in abundance in our

rich swamps. If some of these plants be cut off close to the ground and transplanted with plenty of its native earth to a damp spot in one's garden, it is most always sure to live and thrive, and the next year 'twill come up and bloom in profusion. The best, and really the only fit time to transfer it to the garden, is in the fall of the year.

Another curious, though not particularly handsome plant, is the *Chelone glabra*, or snake's head, sometimes called "balmony." It is one of our common swamp inhabitants, and is easily propagated.

Many persons become very enthusiastic over the numerous grand and beautiful lillies that are displayed in every conservatory and flower garden. They are not aware of the fact that our wild woods produce two lillies, *Lilium canadense*, or the yellow lillie, and *Lilium superbum*, commonly called Turk's cap, which, when brought into our gardens, may be easily subjected, and forms a fine addition to any collection. I have seen the Turk's cap in its native haunts with fifteen handsome drooping flowers that might well adorn any garden.

They flower in June, and travel very slowly. The time to remove them is in the autumn, when they should be cut down to about three inches above the root. New stems will appear the following year.

The birthroot, or bath flower, *Trillium*

erectum, is a very interesting plant on account of the symmetry of its parts; they being all in threes. The large purple flower is also gorgeous, but on account of its vile odor it is not generally admired. It is easily cultivated.

Most of our commoner wild violets will grow under cultivation. I would mention the yellow species and the sweet scented white violet, (*Viola blanda*), as easily grown and very pretty.

Other plants are the fringed gentian and the closed gentian, (*Gentiana crinita* and *G. andrewsii*); the *Helium autumnale*, or sneeze weed; and the golden aster, or *Chrysopsis manana*.

Many other species of our native flora might be brought under cultivation. It only requires trial and patience on the part of the grower. It affords a large field for practical work, and I hope that in the few years to come much work may be accomplished in this line of investigation, and that our gardens may be increased by many handsome new wild flowers.

Notes From a Long Island Collector.

BY ARTHUR J. HOWELL, BROOKLYN, N. Y.

I was at Lake Grove, Long Island, from May until September, this year, and as I took a great deal of interest in studying the habits of our little feathered friends, I thought some of the readers of the NATURALISTS' COMPANION might like to read a few of my notes and experiences.

The Yellow-shafted Flicker, or "High-ole," as it is called, is quite common in this locality, but very little is seen of him after the breeding season, which is from the middle of May to the first

of June. Then, and when the young are hatched, you may hear his loud, rattling call quite frequently, and if you should knock on a tree which had a hole in it, you would be quite likely to hear a response from a number of rather uncultivated voices in the depth of the hole. The eggs are merely deposited on some chips at the bottom of the hole, which I have generally found in an apple tree; it may, however, be frequently found in oak or poplar trees, where it is to be found anywhere from four to fifty feet from the ground; the average height being about ten to fifteen feet.

On the 22d of May I took a set of six eggs, which were partially incubated, and another set of the same number on June 1st, which were fresh. The latter looked especially beautiful to me, as they lay in my hat in the sunlight, the yolk appearing through the glossy white shell. Two weeks later, on June 16th, I went to the nest again, and found seven eggs, which, out of pity to the birds, I did not disturb. The bird is very cowardly when its nest is approached, flying away without so much as a look back.

The Kingbird is another common summer resident, but not particularly liked because of its pugnacious habits. It will attack almost any bird that happens in its way, and a Crow without several Kingfishers after him is an uncommon sight.

While out collecting one day, I noticed a Catbird stealing slyly toward a Kingbird's nest, with the intention, probably, of sucking the eggs. In my indignation, I was about to throw a stone at him, when the owners of the nest appeared, and with loud screams, drove the intruder away. Forgetting

my indignation, I decided to have that nest for my collection; I accordingly ascended the tree and found that the nest contained two eggs, which I left, desiring the set. Two days later, I went there, but, alas! the eggs were gone, which was evidence that the Catbird had got the best of the Kingbirds.

About the first of June, the Kingbirds may be seen flying about with nest-building materials in their beaks, coming even to the door-yard to pick up pieces of thread, string or rags, and by following them, you will find that they almost always bring up in an apple tree, on the end of a slender, horizontal limb, on which they build a strong and compact nest of hay, straw, wool, string, shreds of cloth, and feathers, and in which they lay their beautiful eggs, white, spotted with dark brown and lilac, generally forming a wreath around the larger end.

One peculiarity of the season that I noticed in this and other species, is the small number of eggs they lay. All the books on the subject that I have ever seen gave four or five as the number of eggs laid by the Kingbird, while this year I have found one set of four and three sets of three each.

Among our most common birds may be mentioned the Robin, the Catbird, and the Chipping and Song Sparrows.

The list of our Fringillidæ also includes the Field Sparrow, the Grass Finch and the Chewink.

I have written this with the hope that some other collector on the Island will have something to say about his experience. What we need, also, is a reliable work on the birds of Long Island. Who will write it?

Exterminate the English Sparrow!

Nesting of the White Eye or Florida Towhee.

(*Pipilo erythrophthalmus*, var. *alleni*.)

There is a very great contrast between the Red eye and White eye Towhee in their nesting, to almost take them to be two different species of birds, instead of only a variety of the same species. The Red-eye I have never found except on the ground in a bunch of briers, grass, or bushes, with the nest covered over on top, while the White-eye chiefly builds on young pine trees from three to ten feet high, with nest uncovered. The nest cannot be recognized from that of the Yellow-breasted Chat, unless the bird is seen leaving the nest. The eggs of the White-eye are also smaller than those of the Red-eye, also much lighter in color, and the markings not so distinct. On May 18th, 1885, I found a nest containing three fresh eggs, in a pine tree, three feet from the ground; found several with incubation too far advanced to take; also several with young in different stages. Both the Red-eye and White-eye Towhee breed here; they both breed twice each season.—GEO. NOBLES, Savannah, Ga., in *S. S. Oologist*.

Naturalists, both old and young, will want some entertaining and instructive magazine with which to pass away the long winter evenings now approaching. Why not take the *Companion*? It is certainly the cheapest, and, as one of our friends puts it, "contains more good reading to the square inch than is to be found on a whole page in the majority of papers." We leave the reader to judge as to the truthfulness of this statement.

As Others See Us.

WELLESLEY, MASS., Oct. 20th, '86.

Dear Sir :—

I will try and write you something for your paper, which, by the way, is the best one I know of, excepting the *Ornithologist & Oologist* and the *Auk*. I take great pleasure in reading it, and if possible will get you a subscriber or two. You have selected a good title; it is really a *Companion*.

Respectfully yours,

S. W. DENTON.

Of course, we could not be expected to publish a magazine for fifty cents that would equal either of the above excellent publications, priced \$1.50 and \$3.00 respectively.—[Editor.

English Sparrows as Fruit Destroyers.

BY FALCON.

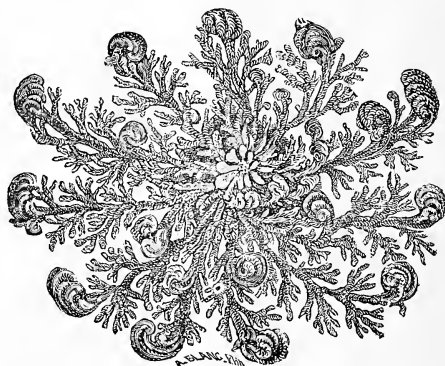
Recently while passing the grounds of a friend who had a number of fine grape vines of which he was quite proud, I noticed a group of English Sparrows, (*Passer domesticus*), in an arbor, chattering away and making a great noise about something. As I am always on the lookout for items against this sparrow, I stopped to observe their movements, and to my surprise, I saw one of them deliberately plunge its bill into the best grape in a large cluster of ripe ones; and not content with one, he pierced nearly every one in the cluster. The sparrow's object, I suppose, was to obtain the juice of the grape.

About a week later I again had occasion to pass that way, and behold! almost every bunch of grapes on the

vine was withered and good for nothing. Each grape was pierced with a small hole in the side, which told the story.

The Resurrection Plant.

This singular plant is really one of the wonders of creation. Imagine a bunch of withered looking, curled up shoots, brown, stiff, and apparently dead, resembling a bird's nest. Place it in water, in half an hour what a



transformation! The withered looking bunch has now opened and is transformed into a lovely patch of moss, entirely covering an ordinary plate. In its native habitat, when the dry season sets in, the plant curls up into a dry ball and is wafted away by winds from place to place; sometimes for hundreds of miles. When at last it reaches a moist place it gradually unfolds itself, makes new roots and thrives in its new found home. This sensitiveness to moisture is so great that even after the plant may seem dead, it will open and close as if it were alive.

Those desiring a specimen of the above plant should write Anna B. Nickels, Laredo, Texas.

Don't use too coarse shot when hunting for specimens. No. 10 will kill anything from a humble bee to an eagle.

Some Stories About Ants.

BY W. R. LIGHTON, CRESTON, IOWA.

Continued from last issue.

Another question which furnishes ground for debate, is whether the organs of vision are so far advanced as to suffice as such in the performance of ordinary duties of life, or whether it is not necessary for the ant to employ the power of scent, which it possesses so wonderfully developed, as a substitute.

Its underground habits would suggest this latter case to be true, as it would have comparatively little need of acute eyesight in its life in the interior of the hill, and scent, on the other hand, would come into most active service.

Francis Huber, the blind naturalist, was devoted to this idea, and some of his experiments were most satisfactory. One of these is very interesting and very simple, and can be tried by any one who cares to see a curious illustration of the correctness of Huber's belief. I have tried it many times and always with the same result.

Take a bit of sugar, or other substance of which the little fellows are fond, and place it upon a sheet of paper or clean shingle, near the nest, and if your ants are native born American citizens, it will not be many minutes before the sugar will be discovered, and after that it will be but a short time until the working population of the hill will be in battle array removing the store of sweets to within doors.

Now watch the procession closely and you will see that instead of each individual acting independently of its brothers in the work and choosing its

own pathway to and from the nest, all pass back and forth in regular columns, each ant following directly in the foot-steps of the one which preceded it, and observing with surprising accuracy each variation to one side or the other.

If, as the first ant started to return, you take a pin-point and force the ant to take a very winding and devious course, that will make no apparent difference to those that follow—they will keep exactly in its foot-steps.

So, too, if you lift an ant up and place it upon the ground eighteen inches from the nest, it will not take a direct road back, as it would if it could see the nest, but will run wildly this way and that, until it strikes the trail of some of its fellow citizens who have passed that way, and will follow this pathway, by scent, till it reaches the nest.

It is believed that ants and bees and other insects, have the eyes sufficiently developed to be able to perceive light and even to distinguish colors, but not so as to distinguish objects one from another.

Other stories will have to be kept for another time, as this paper is stretched out far beyond the space I should have taken.

During the last two years, several Celtic tumulus in the district of Geinberg, in Upper Austria, have been opened and found to contain valuable relics of prehistoric times. Recently a similar tumulus was discovered at Mattighofen, in the same neighborhood and among its contents was found a diadem of pure gold richly carved in the well-known style of old Celtic art. *Young Naturalist's Journal.*

Cryolite or Kryolith.

BY DR. B. F. MASON, SAN LEANDRO, CAL.

Cryoline, or Kryolith, is usually found in snow-white masses, although sometimes its color is brown, red, and even black. Its names are from the Greek words, *kruos*, ice, (to which its remarkable quality of melting in the flame of a candle alluded;) and *lithos*, a stone; hence its common name of ice-stone. It is a brittle, rather soft, sub-transparent, or translucent mineral, with a vitreous or pearly luster. Its composition, by a chemical analysis, is found to be: aluminum, 13; sodium, 32.8; fluorine, 54.2. It is distinguished by its fusibility in the flame of a candle, and then heated in an open tube, by its giving off hydrofluoric acid, which etches the glass. The water which condenses at the upper end of the tube, reacts for fluorine with Brazil-wood paper; while in the forceps it melts easily, coloring the flame yellow.

It is soluble in sulphuric acid with the evolution of hydrofluoric acid. On charcoal it fuses easily to a clear bead, which on cooling becomes opaque; after long blowing, the sodium is absorbed by the charcoal, a suffocating odor of chlorine is given off, and a crust of alumina remains, which if heated with a solution of cobalt, gives a blue color.

A number of years ago this mineral was only found in isolated pieces in the Ural Mountains, in Russia, and a specimen was worth its weight in silver, mostly for cabinet purposes.

In the year 1857, the Danish Government sent a scientific expedition to its ice-bound possessions for the purpose of gathering a collection of the clothing, weapons, utensils and fishing tackle

of the Esquimaux, for exhibition in the Danish Museum. When this collection arrived in Copenhagen, a scientist discovered that the fishing nets were weighted with rare stones. He examined them and found that they were the rare mineral, cryolite. An expedition was soon formed and a mine opened, but the first attempt to work the mineral failed, because chemistry had not yet succeeded in extracting the valuable properties of the mineral at a reasonable cost. But shortly after, Prof. Thompson made a discovery by which cryolite became of great value to many manufacturers.

The first company in the United States to appreciate the usefulness of cryolite was the Pennsylvania Salt Manufacturing Company, and they were wise enough to enter into a contract which gives them a perpetual monopoly in America, and an absolute control of three-fourths of all the cryolite mined in Greenland.

To show the importance of this mineral, there was imported and consumed in the United States, in the single year 1884, an amount worth one hundred and six thousand and twenty-nine dollars.

The mine is situated at Evigtok, in West Greenland, where it constitutes a large vein in gneiss. The workings have now reached a depth of four hundred feet, and the cryolite taken out at that depth is of as good a quality as that found at the surface, and apparently of unlimited quantity. Work in the mine can only proceed in the spring months, after which the water of the ocean is allowed to flow into the mine. An ice crust ten to twelve feet thick soon forms, and protects the mine. When spring opens, an aperture is

made through the ice crust and the water pumped out of the mine. Were this precaution not taken, the mine would become thickly coated with ice and could not be worked at all.

The great demand for cryolite has given a strong impetus to the search for it in the United States, and in 1883 a mineral resembling cryolite was discovered at Pike's Peak, El Paso county, Colorado, and several samples of it were sent to the president of the Pennsylvania company. He pronounced them to be cryolite, though of an inferior quality, and immediately wrote to have a ton of the mineral sent to him, even though the cost should be \$5,000. The answer returned was that all the cryolite that could be found would not amount to a hundred pounds. This is the only locality in which the mineral has been discovered on this continent.

Cryolite, or kryolith, can be employed for a great variety of purposes, among which are the manufacture of lye, caustic sodas, aniline colors, porcelain hollow-ware, milk-white lamp globes, and also in the production of metallic aluminum.

About Cleaning Oily Specimens of Lepidoptera, etc.

If a specimen becomes oily, it is generally believed that its beauty can never again be restored; but with a trifling cost and a little labor any specimen will in a short time have again its former lustre, without injury to the insect. This remedy has been tried on the most tender Diurnals, as well as on Sphinges and Noctuids. It can be used on every insect. Should a specimen be oily throughout, body and

wings, it may be put in the following fluid: One part of sulphuric ether to two parts of the strongest alcohol, and left therein for about twenty-four hours. Should the specimen be very oily, another bath may have to be applied.

Should this second bath, after removing the insect, be only slightly discolored, the insect may be put in the last bath, which consists of pure sulphuric ether, in which it is left a few hours only. After being taken out and partly dried, it is put on the spreading-board.

Another way of cleaning specimens, where only the wings are oily, is this: The specimen is put on the spreading-board, under side up, without fasten it in any way, and the purest spirits of turpentine poured on to fully soak the wings, after which finely-powdered pipe clay is strewn thickly over the affected parts, and this left to dry. Should the clay, after being dry, be yellow, the oil is not all out of the wings, and the above has to be renewed. Should the clay be white after drying, it can be relied upon that every particle of the fatty matter is drawn out of the wings. To remove the clay need a little experience, though any one can do it with a little care. Hold your specimen on the upper part of the pin, and give the pin a little jerk near the point, and the clay, being brittle, will easily fall off. After it is all removed the specimen may be brushed off with a fine camel-hair brush until clean. A specimen treated in the above ways will never again become oily.—*Canadian Entomologist*.

In the Arctic region there are 762 kinds of flowers. Fifty of these are confined to the Arctic region.

A Battle of the Liliputians.

BY W. W. WESTGATE, HOUSTON, TEXAS.

I saw an article in the COMPANION a short time ago in relation to ants, that reminded me of something that occurred recently under my own observation.

While sitting at my desk one afternoon, I happened to turn my head and saw a long line of ants coming and going on the lower ledge of an open book case behind me. My naturalistic instincts were at once aroused and every thing dropped to watch the ants. I soon perceived that they were entirely different from any species that I was familiar with. They were black, about an eighth of an inch in length, had very long legs, and their antennae were slender and long, terminating in a large knob. They would not bite; I caught several and held them in my hand, squeezed, pinched, and by every means in my power tried to induce them to bite, but all efforts were in vain. They seemed crazy, and ran all over my hand, waving their antennae wildly in the air. All that passed in one direction went empty handed, but those returning the other way were loaded with dead ants. In one place an ant would go lugging along a dead one; in another place there would be three or four all tugging and burdened with another. Tracing them up, I found that they came from a large newspaper spread out on the bottom of the book case, and seemed to be engaged in fighting one of the battles of the age, and one of the severest insect fights, too, that I have ever witnessed. The newspaper was covered with dead, dying and strug-

gling ants, all in a mass together. One ant would run up to another and they would regard each other for an instant, tapping their antennae together, then rush at each other in a perfect fury; the fight thus commenced would last until one or the other was killed, and carried off in triumph by the victor. I could almost fancy that I heard their jaws snapping, and terrible imprecations belching forth. Again, in another place, one ant grabbed another by the leg and attempted to carry him off, whether he would or no; while a third would seize the first, and a fourth would tag on to the third, and so, whirling and rolling about, they had a "merry go around" of their own. My observations were suddenly brought to a close by a hand unexpectedly slapped down among them, stopping their fight and dispersing the combatants; the noise so startling them that they forgot their pugnacious intentions in their efforts to escape. So far as I could perceive, there was no difference between them; they seemed to be all of one kind. I subjected them to the microscope, but could not perceive the slightest variation. Will some brother naturalist name them from this meager description?

A few more contributions from our readers would be very acceptable. Come, friends, you can certainly find some interesting subject which to write upon; some of your experience in the field, or observations on some species new to you, would, undoubtedly, be very interesting. Write only on one side of the paper. By all contributing a few short articles now and then, it will make the paper more interesting.

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We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

CHARLES P. GUELF,

EDITOR AND PUBLISHER,

Brockport, New York, U. S. A.

ASSOCIATE EDITOR,

H. F. Thompson, Indianapolis, Ind.

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RANDOM NOTES.

What has become of the *Hoosier Naturalist*? Wake up, Trouslot.

A sure sign of winter's approach is a visit from our little feathered friend, *Junco hyemalis*.

Now doth our feathered songsters bid us adieu and take wing to the sunny South. Wish the English sparrow would ditto.

Long winter evenings are approaching, friends, and you will want something to read. Take the COMPANION.

The publishers of the *Collector's Science Monthly* inform us that they will continue the publication of their paper immediately.

Mr. H. M. Downs, of Rutland, Vt., late publisher of *Tidings from Nature*, is now issuing a weekly publication known as *Science Series*. We wish him unbounded success.

How lonely the woods are now; the trees are foliageless; nearly all of the feathered tribe have left us; and the only sound that breaks the stillness is the rap of the woodpecker of the occasional chatter of the squirrel.

We wish to recommend to our readers Mr. J. M. Southwick, of Providence, R. I., whose advertisement appears in this issue. We have had considerable dealings with this gentleman, and have always found him prompt and reliable, and his goods are always of the best.

We have somewhat improved the appearance of this magazine since the last issue. We believe in improvements, and the faster the subscriptions arrive, the more the improvements. What other magazine has made a better record in one year than the COMPANION?

A great deal has lately been said concerning the preservation of our native birds. Various journals attribute their very rapid destruction to numerous causes, such as the taxidermist, the young egg collector, the hawk, the milliner, and a variety of other sources. We will express our opinion on this all important question at a later date. In the mean time we would like our readers to express their views on the subject.

Curiosities of Howe's Cave.

BY G. E. WELLS, AMES, N. Y.

Continued from last issue.

Here is a most remarkable stalagmite of many tons weight, the Tower of Babel, which blocks the path and reaches to a great height. The Elephant's Head and Indian Dugout are passed and we next come to Cataract Hill. What is this sound that comes from within? A heavy roar as if a mighty cataract had burst and was sweeping down upon us. The first impulse is to retreat, but our guide reassures us, and we press on, expecting to find some great cataract, but now the roar seems to come from beneath us, and as we proceed is lost entirely.

The next point of interest is Music Hall where musical tones appear to be never done echoing, but go dancing gaily about, returning again and again, filling the air with harmony. A low note produced here, echoes and re-echoes mysteriously through the silent chambers, completely filling the cavern with a weird vibration, unearthly and indescribable. A board on being raised and let fall with a slap upon the clayey path, sounds like a clap of near thunder, whose echoes roll and rumble frightfully. Just beyond we pass the Keel of Noah's Ark, and here the noise of a cataract increases to a thunderous sound. It must be a young Niagara, at least. Soon we come to it, and lo! a tiny waterfall four or five feet high, and perhaps a foot wide, at the outlet of a little lake. We now enter a narrow passage and soon arrive at the Rocky Mount-ains. These consist of huge masses of

rock and broken stalagmites, upon which we are obliged to climb. Here is Pike's Peak, a pure stalagmite forty feet high. The roof of the cavern at this point is lost in the darkness. We next come to the Valley of Jehosaphat, about a quarter of a mile in length, and probably a hundred feet high. A stream of clear, cold water, called the River Jordan, meanders along the whole length of this valley. The forms of stalactites seem to increase in beauty and interest the farther we go. Here is the Baby Elephant, Uncle Tom's Cabin, with Aunt Chloe's Bonnet, just as she left it, as natural as life. Now we come to the Yosemite Valley, a deep canon, along the edge of which we creep, fifty feet above the rushing stream. Overhead, for quite a distance are masses of rock, some of them weighing twenty or thirty tons, which seem to have dropped and caught between the walls.

Our course, which seems to have been nearly straight thus far, is suddenly blocked by a solid wall. As our time is limited, we take a passage that leads to the right, and soon find ourselves in the Winding Way, a long passage just wide enough for one to pass through. This passage is very crooked, forming a long series of S's, so that you can hardly see a person in it three feet ahead. This wonderful passage is said to be eighty rods long, and its walls are smooth as glass. At the end of this crooked passage is the Devil's Gateway,—rightly named, leading as it does opposite the Straight and Narrow way—and now we come to the Silent Chamber.

We have long since passed out of hearing of the cataract and the ripple of the little brook, and now no sound

reaches us from the outer world; a stillness as of the grave holds everything is silence, so profound that it seems to be crystallized.

"Now," quoth our guide, "let us blow out our lights." "But your matches—have you matches? We are three miles from daylight, and— Here are matches, and see, they are good;" and out went our lights. "Now listen and watch for five minutes." We listen in the silence that is really dead, and in the darkness is almost felt, watching two mysterious, luminous balls of light, which our guide tells us are always seen by persons who try this experiment, until the silence seems to creep up and around us like some medium dense as water. But here are our lights again, and on we go, passing first a stalagmite clear as crystal, named the Broken Column, then through Fat Man's Misery, a narrow passage about thirty feet in length, through which we are obliged to crawl, lying flat on our faces. A very fat person would have some misery to get through here. The last object of interest is soon reached, it is called the Rotunda, and is the greatest wonder of all, a circular room twenty-five feet in diameter, and which rises, our guide tells us, to a height of three hundred feet. "How do you know this hall to be three hundred feet high?" we inquired. "I'll tell you," he replied, "we have repeatedly fired rockets up into this space, and a rocket warranted to burst at three hundred feet just shows the upper end." We are told that we are four miles from the entrance. The sides of the cave show everywhere marks of the swift stream that once flowed through this passage, forming this wonderful cavern.

We would like to speak of many other objects of beauty encountered, but this article is already too lengthy. Bats are the only living thing found in the cave. The round trip occupies about three hour's time. The air is pure and invigorating. The whole is a wonderful creation and an interesting study as well for those who admire the beauties and curiosities of nature as for those who adore the great Author of the Universe and delight in contemplating his wonderful works.

THE END.

Audubon and the Snake.

A very amusing anecdote is told of Audubon, which occurred while on a collecting tour through the South some years ago. He and his friend were watching a woodpecker fly to and from a series of holes excavated in the trunk of an old tree. The bird at last stayed in the holes longer than usual, so Audubon concluded to climb the tree, and if possible, capture the bird by closing the openings of the holes. When he had reached the supposed hole, he was in the act of putting in his hand, when a large black snake poked his head out. At the moment he was so frightened that he let go all holds and fell headlong to the ground. His friend, seeing him fall, rushed to his assistance, and on inquiring if he was hurt (which accidentally he was not), received this answer: "No, I am not hurt, but if you want to see a frightened snake, just climb that tree and look into that hole."

Agents wanted to canvass for the COMPANION on liberal terms. Send a stamp for commission.

Owls Without Memory.

A naturalist in the West has concluded either that owl are devoid of memory or that they do not mind going about with owl-traps attached to their legs.

He set a trap to catch an owl, and it mysteriously disappeared. He then set a heavier trap, and caught in it an owl which had the first trap attached to one of its legs. The phrase, "stupid as an owl," seems a fitting reflection upon a bird which would set about making a collection of owl-traps in such a manner as this.—*H. L. Bragg.*

Quartz.

BY W. S. BEEKMAN, W. MEDFORD, MASS.

As several have shown quite an interest in the description of various quartz specimens, I give a little account of a few more varieties, and defer the description of the most beautiful metallic minerals I intended for this paper, for another mouth.

One of the most curious quartz specimens I have had the pleasure of possessing was a crystal from some foreign locality. The material was of an opaque, milky color, and the form was a perfect hexagonal pyramid, being a termination, the prism being wanted. It was a surprise to find that it separated into two perfect forms, and as the one underneath was hollow, I probably only had part of the entire crystal, and there may have been more sections on top. The two pyramids were of the same thickness, but of course the upper one was a trifle smaller than the lower. It seems that at regular intervals, during the process of growth, the

deposition of quartz was interrupted by the formation of a very thin layer of a micaceous clay, and then as the crystal continued to form, the layers of clay formed weak joints, as it acted as a lubricator and prevented adhesion. This capping of the quartz gives it the name that rightly describes it, *CAPPED QUARTZ*. Instances where the growth of a crystal stops and immediately continues again without the interference of foreign matter, is common, and crystals thus formed are known as *phantoms*. The dim outline of a termination inside of a clear crystal is a *phantom* in every sense of the word. At one locality in Canada, the phantoms are coated with a very bright red layer of some mineral, and makes very attractive specimens.

There is a locality in Main that gives very curious phantoms. When the new crystal begins to form on the termination of an already finished one, instead of carrying out the symmetrical figure, it bulges out and forms a short, fat crystal on top of a long and slender one, that looks for all the world like a boy carrying a child astride of his shoulders.

I have before me a crystal that I would like to exhibit to all of the readers of this valuable magazine, if they could be collected into one large hall, and all have a pleasant time telling of their work. There is one objection to the crystal, in my eyes, that renders it more worthy of a mantle than to be placed in a cabinet, and that is, it has been cut and polished. I dislike such specimens among minerals. Of course in many cases polished specimens are required to bring out the beauty. The crystal I have reference to, is of Japanese origin, and was cut and polished by

a Jap, who made a rude effort to imitate its natural form of a crystal, but got eight sides instead of six. The crystal is of clearest water, about four inches long and two in diameter. It seems to be perfectly clear and pure, but a very rigid examination discloses that instead of being perfectly pure, it is completely filled with asbestos needles; there is not a quarter of an inch of pure quartz. The asbestos fibers are so transparent and fine that it is only in a certain direction they are visible. They reflect light at almost the same angles as that of the quartz, and are thus rendered nearly invisible.

In examining for the fibers, if one is a close observer, another quite wonderful thing will be discovered. There are in the crystal eleven perfect phantom terminations, and at the top seven more are close together. Taken as a whole, the crystal offers quite a study.

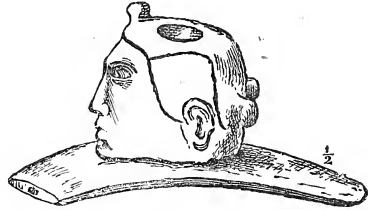
I have recently received from North Carolina two quartz crystals to dispose of for twenty-five dollars. They are of a very clear, smoky color, almost of a wine color. They weigh about eight pounds each, and contain hardly a flaw. Large crystals are generally cloudy at the base, but these are of a uniform clear tint throughout.

There are many more varieties than those above described, in fact I have one rose-tinted crystal in mind that cannot be described so as to present its beautiful appearance in a manner that would be readily understood by anyone. I shall endeavor to describe a very beautiful Japanese mineral in my next paper.

By a Japanese process seaweeds are made into paper so transparent that it may be substituted for window glass.

Interesting Facts About Mound Pipes.

BY E. A. BARBER, A. M., PHILADELPHIA, PA.



From some of the oldest artificial mounds in the United States a considerable number of tobacco-pipes, of a peculiar type, have been exhumed; consequently this form of pipe is believed to be the earliest made by the inhabitants of America. The general form is a broad, flat platform, slightly curved downwards, with a bowl rising from the centre. This style of pipe is complete in itself and does not require an additional stem, one end of the base serving for a handle and the other for a mouthpiece. These pipes occur with plain, spool-shaped bowls or are elaborately carved in imitation of birds and animals.

Nearly forty years ago the first discovery of such pipes was made near Chillicothe, Ohio, by Messrs. Squier and Davis, during their exploration and survey of ancient mounds in that State. From one earthwork they took nearly two hundred pipes, which are now deposited in the Blackmore Museum, at Salisbury, England. One of these, which is here figured (from Dr. Ran's "Archæological Collection of the U. S. National Museum"), is probably the finest example in existence. The bowl represents a human head and is most beautifully carved.

Next to this collection of mound pipes, the Davenport (Iowa) Academy of Natural Science possesses the largest series of such pipes in the world, which now numbers about sixty examples. A few years ago Mr. W. H. Pratt, one of the members of this Society, made inquiries as to how many other specimens were known in collections in the United States. He succeeded in finding, all told, only about a dozen specimens, but since then several others have come to light and there may now be as many as twenty on record.

Mr. A. E. Douglass, of New York city, has probably the finest private collection of pipes in the United States, which includes several specimens of this form. Amongst others he possesses a platform pipe with a bowl carved to resemble the head of a Rocky Mountain sheep, its peculiarity consisting in the fact that the head faces *away* from the smoker. This is the only specimen known which possesses this feature. In every other specimen thus far discovered the head of the animal, bird or human being faces *toward* the stem orifice. Platform, or curve-base pipes, as they are sometimes called, are the most valuable of all aboriginal pipes.

Metamorphosis of Arachnida.

BY "FRANCIS."

"Do spiders undergo metamorphosis?" If this question were asked of the ordinary observers of Nature, the answer would probably be purely a Yankee one. "Who ever saw a spider in the form of a grub, change into a pupa, and finally transform into a web-spinning insect?" Such a supposition

savours to a certain extent of absurdity. But as a matter of fact, many of the *Arachnida* do pass through the stages of larva, nymph, and perfect insect. In some genera the metamorphosis is very marked, and in a few species even further change is super-added.

Most of the *Arachnida* that do not undergo metamorphosis, shed their skins from time to time, and internal changes go on before and after these moultings, which are very considerable and important. Moulting after moulting produces fresh changes, and the appearance of new structures, so that finally the sum of all these alterations almost equals in amount those which the transforming spiders undergo. The non-transforming spiders, however, are hatched from the egg in a more perfect state of development. They are hatched with four good pairs of legs, while their relatives, that suffer metamorphosis, have only the rudiments of three pairs when they emerge from the ovum.

Most of our common spiders, so called, simply pass through several moultings, each time changing essentially their general structure, and each time gaining in strength and activity. Being hatched with only imperfectly developed limbs, and with only a limited amount of strength, they do not come to their full strength and vitality until their last moult has taken place.

The spiders which undergo transformation include the *Acarida* and the *Hydrachnida*, or water mites; those curious little spider-like insects that we see in such countless numbers on the surface of our pools. The eggs may easily be found by a careful examination of the surfaces of the rocks, in and near the water.

As soon as the larva are hatched they betake themselves to their feeding places; some of them eating the stems of water plants, and others preying as parasites upon the large water beetles, as the *Dysticus* and the *Nepidae*.

Fastening themselves securely to the side of their victim, there they stick and eat until ready to enter the nymph state. There is something remarkable about the growth of these larvae; the only part of them that grows at all is the abdomen, and that swells to such enormous proportions, that finally one would easily mistake their head and thorax, legs and all, for the head itself, so great is the contrast.

As soon as they are ready to begin the first transformation, they leave off eating and commence to shed their skin. The nymph, however, strange to say, still remains fixed to its victim, and still devours its flesh. And there it stays until the final change takes place, and then the perfect mite appears, ready to skip about with its fellows, on the water.

Although these members of the spider tribe do undergo metamorphosis, there is no other class of insects whose individual species show so great a variance in their mode of development.

Some, as we have seen, suffer metamorphosis, and some simply have a succession of moultings, and there are still others that apparently have no change whatever; and the history of the maturing of the ovo-viviparous *Arachnida* has yet to be written.

We would like the readers to assist us as much as possible by sending in contributions, exchange notices, correspondence, queries, etc., and take a general interest in the magazine, and we will show you an interesting journal

Californian and Polynesian Fish-Hooks.

In his work on pre-historic fishing in Europe and North America, Dr. Rau has drawn attention to the similarity of South Californian and Polynesian fish-hooks of shell and bone, and has figured a few from South Sea Islands for the sake of comparison. In consequence thereof, he received, a short time ago, from the ethnological department of the British Museum, a communication, together with a large plate of drawings of Polynesian fish-hooks preserved in the museum. Some of these are strikingly like the Californian specimens; not only does the curved points in these hooks approach very closely the shank, but they also show, like the Californian hooks, a barb on the outside. This analogy is the most significant, as some ethnologists have claimed a relationship between the Polynesians and South Californians.—*American Naturalist*.

One of the most obliging professional scientific gentlemen is Prof. D. G. Brinton, of world renown fame. He is ever willing to assist a young student.

We are pleased to learn that our friend and contributor, Mr. W. S. Beekman, who has recently been very ill, is recovering.

Few, of what a year ago were numerous, papers to-day devote any space to archæological news. We promised to, and intend to do so.

Pecan Point, in Arkansas, is one of the best fields for the potterist that the archæologist may wish to search. Many valuable finds have been made there recently.

CORRESPONDENCE.

Allow me to say that my "ad" in your magazine has paid me the best of any similar one I ever inserted in any publication. I had about three or four thousand specimens for sale and exchange, and have got rid of almost all so soon. Respectfully,

G. F. WHITTEMORE, Fitchburg, Mass.

DEAR SIR:—Thinking that the following might be of interest to yourself, your readers and advertisers, we concluded to write you.

We wish to WARN all collectors, dealers and every one against ASHLEY W. KYES, of Merrill, Wisc. Send no goods to him unless you have the READY cash from him, and then be careful. Although our loss is small, yet if he would break his contract for a small sum he would for \$100 or more if he had the chance. We will inform anyone of the particulars if they wish. We affirm that said Kyes has defrauded us of money righteously due us, and in declaration of same affix our names and title.

CHAS. H. DICKINSON, } of DICKINSON
EDW'D L. DURKEE, } & DURKEE,
Oct. 25, 1886. Sharon, Wisc.

Some time last April I found a nest of the Red-tailed Hawk placed in the top of a beech tree, about fifty feet from the ground. Seeing the female hawk fly off the nest, I at once began to ascend the tree. Reaching the nest, I peered over the edge and saw one egg of an ashy-white color with a few blotches of reddish-brown at the larger end. Not taking the egg this time, but awaiting a week later, and scrambling up the tree again, I saw another egg of a dirty white color, mottled over the entire surface

with light reddish-brown dots. The nest was a shabby affair composed of sticks and twigs, rope, rags, grass, and a few other indescribable material. I climbed the tree. While in the nest of the hawk, I saw a nest of a Red-tailed Hawk, Ohio.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

G. D. STORY, Carterville, Mo.—Fine large mineral specimens to exchange for minerals, fossils, petrifications and curiosities.

FRANK HARRIS, La Crescent, Minn.—Fine English beagle dogs and puppies, for natural history books or birds' eggs. Send lists or make offers.

MRS. W. S. HAMMAND, Carthage, N. Y.—I have a choice variety of greenhouse plants which I will exchange for blooming bulbs of autumn blooming lillies and dentzias. A generous exchange given.

W. G. TALMADGE, 37 Garden St., Hartford, Conn.—A 5 drawn, black walnut cabinet, valued at \$3.00; double blade ash canoe paddle, 7 foot, value \$1.50; 85 best blue paper boxes, value 75c.; Vol. 1 Young Oologist and Vol. 1 Tidings from Nature, neatly bound, value \$1.00, to exchange for advertising space in any paper of 500 or more guaranteed circulation.

QUERIES AND ANSWERS.

Mrs. L. W.—Will some one please describe the color of the eyes of the barred owl.

We have a number of specimens sent us for identification, and being unable to identify them, we have sent them to several specialists and will endeavor to give our readers the names of their specimens in the next issue.

We will send this magazine for one year and a copy of Davie's Egg Check List and Key to Nests and Eggs of N. A. Birds, for \$1.25. The regular price of the book alone is \$1.00. This Check List is finely illustrated with seven full page engravings, and contains about 200 pages.

The 'Naturalists' Companion.

"Wheresoever the Naturalist turns his eye, life or the germ of life lies spread before him."--Humboldt.

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CHARLES P. GUELF,
EDITOR . . AND . . PUBLISHER.

50 Cents per
Annum.

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The Zoologist's Wooing.

When first I saw you, Eland deer,
My Hart it did repine,
Because I Gnu how good you were,
And wished that you Ermine.

When I your Tapir fingers dressed,
Upon that eve in May,
The glance you gave me Seal-ed my fate,
And I'm still yours to-day.

I'll never break Ape art the Lynx
That bind my Hart to thine,
Till I shall Lion my last couch
And in my grave recline.

Gaze, Eland deer, upon me now!
(That's Civet pleases you),
One glance from your bright eyes will light
This Mole-dering fire a-Gnu.

And if it is for Porcupine,
Though it should ruin me,
I'll bring as many Hamster you
As one could wish to see.

But then, of course, weak Antelope,
For that would be a Boar,
But we can stay right here Rat come.
And I'll never leave you Mohr.

—Hoosier Naturalist.

EVOLUTION;

ITS PHASES, THEORIES AND RELATION TO
RELIGION AND MODERN SCIENCE.

BY "FRANCIS."

TRY to evade it as we will, do our best to escape the discussion, there is one question that must sooner or later be met, and that question is as regards the theory of Evolution.

Ever since science first began to reveal itself there has been a long and bit-

ter struggle between it and the Bible; and now, although all the ancient points of dispute have been settled, and although it has been proved to the entire satisfaction of both scientists and theologians that science has thus far fully corroborated the Bible, yet in this struggle with this comparatively recent theory, the old warfare has been renewed with increased vigor. Ministers, even, will stand up in their pulpits and preach Evolution at the expense of the Bible; nay, some even go so far as to renounce the Bible entirely, so blinded and infatuated have they become with their new hypothesis.

With a foe like this, and this apparently is a foe, it is indeed time that churches should be waking up to the danger that threatens them, and in truth they are. But let us see if this theory is as much of an enemy to religion as it appears. If it is, then young scientists are placed in a very dangerous situation; they cannot help seeing and hearing more or less of this controversy, and if they are to be taught that one must be true to the exclusion of the other, then it is very obvious that the Bible is in great danger of being overthrown, with an adversary as powerful as science.

But science is by no means an adversary of the Bible and religion; quite the contrary, the two should go hand in hand, and I am going to make a very bold statement, and am prepared to

take the consequence. I say that had it not been for the narrow-mindedness of those who have been from the first the antagonists in this question, well educated and rich in scientific and theological research as they have been, I say had it not been for their narrowness of views, the Bible need not have entered into the controversy at all. But now that it has become involved, and its truth and authenticity are at stake, the question must be impartially and thoroughly discussed. To accuse those scientists and boasted "free thinkers," who have forwarded this theory, of narrow-mindedness, may seem a little bold and unwarranted; and on the other hand, to accuse such men as Agassiz and those who have opposed the theory, of the same thing seems equally unwarranted; but however great and able they may have been in other lines, has not their course in this direction justified the accusation? We will except, perhaps, from them the name of Agassiz, for it is evident that he drew his conclusions from purely scientific reasoning, but it is a very significant fact that twenty-eight of the thirty-two reasons he urged as opposed to Evolution are now used as arguments *in favor of* that very theory. As soon as sufficient proof was found to warrant the acceptance of the theory, these scientists did so, and then fearlessly came forward and charged the Bible with being a lie; and why? Just because, in their haste, they have looked only at one side of the question. And also the ministers who have opposed the theory: at first thought the hypothesis that there is a system of evolution extending through the animated kingdom seems in open opposition to the belief that each successive

organisms is a separate creation; and these men have not stopped to give the matter a second thought. How foolish their hasty conclusion would seem to them if they would stop and consider it.

Why, look back over the history of science, and how many times has this same hostility and antagonism manifested itself, and how many times have the two opposing versions of the same story been proved to be wholly reconciled and coincident. Take for example the story of creation, or of the deluge, as revealed by science and the Bible. It was the same thing, the same controversy, that is now being waged between Evolution and the Bible. Just as long as scientists argued upon one ground, and clergymen upon another; just as long as scientists said that the nebular hypothesis was true, and clergymen said it was false because in opposition to the Bible; just so long the warfare was bitterly and fiercely waged. But as soon as the two parties became willing to relinquish their hostility, and argue on a common ground, the clouds of doubt began to disperse and finally disappeared altogether. It is true that science tells us that the sun was the first in the order of creation, and the Bible says the earth was created first, and the opposition here is apparently more strong than in the case of Evolution. But the Bible, we must remember, was written in popular language, and just as soon as theologists were willing to do the most consistent thing in the world, to take the *earth* as the center of observation, then the two stories agreed in the most minute particular.

And isn't it a very significant fact that out of every such controversy, in the end the Bible has come off victori-

ous, with its truth only strengthened and corroborated by the attack?

It was so in the story of the deluge; it was so in the many historical disputes; it has been so in every attempt to overthrow it; and it will be so in this last antagonism with Evolution.

As long as one party stands on one cliff and the other party stands on the opposite cliff, with an impassible ravine between them, the settlement cannot come; but just as soon as they can agree to come together on the same ground the clouds will again disappear, and the unity of Science and the Bible be made all the stronger and more apparent.

Next month we will attempt to show that the question may be argued and settled on a purely scientific basis, and with no fear of even an insinuation against the Bible.

A Letter from Texas.

On October 27th I caught a Burrowing Owl, (*Speotyto cunicularia hypogæa*), alive, and kept him two weeks or more, when he died. He had a hole at the roots of a mesquite tree, in which he dived when he saw me. When I got him out he made a horrible noise, like nothing else that I know of, and cracked his bill, which with a hiss, were the only sounds he made. His dinner consisted mostly of raw beef. The place where I found him was about two miles south of the city, where the mesquite bushes grow about fifteen feet high and twenty feet apart. It is a favorite breeding place for Bell's Vireo, Orchard Oriole, Scissor-tailed Flycatcher, Black-throated Bunting, Lark Finch and the Mocking-bird, all of which are very abundant. I saw my

first Robin on the 1st, and on the 19th of the month I saw a Road-runner, (*Geococcyz californianus*). This is the first one that I have seen here, although they are plentiful around Austin, where I resided until two years ago. They generally build in oak trees, ten to twenty feet from the ground, and make a rather flat nest composed of twigs and roots and lined with cow dung. The eggs, four to seven in number, are pure white, though generally somewhat dirty. A friend of mine got a young Road-runner, which he tamed, and it would follow him everywhere. It would eat anything, and had learned to catch mice, lizards, etc. A boy impaled an insect on a pin and held it to the Road-runner to see what it would do, and before he could prevent it, it swallowed the insect, pin and all.

CHAS. D. OLDRIGHT,
Nov. 23, 1886. Waco, Texas.

Mr. W. S. Beekman, West Medford, Mass., has favored us with a sample of the Persian mineral lapis lazule. Upon being wet it attains a very rich beautiful blue color.

We are sorry to inform our readers that our friend and associate editor, Mr. Harry F. Thompson, of Indianapolis, Indiana, has severed his connection with the COMPANION, he being too much pressed with other work to devote the necessary time to the magazine. While on our staff he has proven himself both competent and obliging, and has filled the position entrusted to him in a very creditable and satisfactory manner. We hope that his duties in life will not be so confining as not to enable him to devote at least a portion of his time to science.

Amber.

BY DR. B. F. MASON, SAN LEANDRO, CAL.

Amber is found in irregular masses with a resinous lustre, without cleavage, and of a yellow, brown, red or even white color. Its hardness is between 2 and 2.5, and its specific gravity from 1.066 to 1.081. It is transparent to translucent, and when scratched with a knife leaves a white streak. It becomes electric on friction and fuses at 287 centigrade. It is a fossil, indurated resin, or gum, of vegetable origin, which has undergone some change while inhumed, due partly to acids of sulphur, probably proceeding from the decomposition of iron pyrites. It is usually found in beds of lignite, in alluvial soil on or near the sea coast.

Its composition is found to be by analysis:

Carbon,.....	78.94.
Hydrogen,.....	10.53.
Oxygen,.....	10.53.

True amber is distinguished from the imitations by its becoming electrical when rubbed, by its usual yellowish-green color and toughness—it can be cut into many forms—also by its burning with a yellow flame, and emitting a peculiar odor. This peculiar odor and the white streak which is left when scratched, are very characteristic of amber.

Amber was called *elektron* by the Greeks, from its so readily becoming electric when rubbed, and thus it gave the name electricity to science. It was named by some of the ancients *lycurium*, though this name was applied by Theophrastus also to gircon and tourmaline, minerals of remarkable electrical properties. The ancient Greek philosophers, who noticed amber's pe-

culiar electrical powers when subject to friction, held the strange belief that it was endowed with a soul. In Arabia for ages it has been considered a talisman against the evil eye, and in other countries a string of amber beads worn about the neck, has long been considered as a protection against inflammation of the throat on account of their warmth to the skin, and their maintenance of a constant circle of electricity. All the ancient writers speak of amber as a precious gem. The earliest Etruscan jewelry consisted of carved amber, which was called lynx stone, it was supposed to have some relation to the lynx. It is said that on one occasion Nero had the amphitheater adorned with amber. One of the largest masses of amber in the world is in the Royal Museum at Berlin, and weighs eighteen pounds. Another in the kingdom of Ava, India, is a little larger than an orange and weighs two and a half pounds. Still another mass, weighing twelve pounds, is owned by a Dantzic, who values it at three thousand dollars.

The greatest quantity and finest quality of amber is found in the Baltic sea, also in the sand on its shores, particularly after a storm, whose violence has washed it up from the deep. This amber often contains insects, and is highly prized as a curiosity. Often the insects appear to have struggled to escape after having been entangled in the soft gum, for occasionally a leg or wing is found some distance from the body.

Amber is mined from the mountains of Prussia; it is found on the coast of Denmark and Sweden; in Galicia, near Lemberg and at Miszan; in Poland; in Moravia, at Boskowitz; in Russia; in

Norway; in Switzerland, and in France, near Paris, in clay. In England it has been discovered near London, and on the coasts of Norfolk, Essex and Suffolk. On the American continent it has been found in Mexico, and in the United States, at Gay Head, at Camden and in New Jersey. To the geologist there is a peculiar charm about the "golden gum," for it carries him back to the ages when there were primeval forests where man's foot never trod. It tells him that under the stormy Baltic and beyond the marshy coast lines of Northern Europe were once titanic woods, abounding with resinous pines and firs, somewhat resembling those of our own age; and that thousands upon thousands of ages ago these pines exuded from their limbs and trunks masses of half-liquid gums, clinging in ball to their rough barks, and that these odorous gums attracted numerous insects and even small reptiles, and that many of them gradually became embedded in the viscid gum. Ages upon ages swept down the vale of time, the amber-bearing pines and firs grew old, perished and decayed where they fell, leaving the exuded gum to harden, and to finally become altered by fossilization under the deposits of succeeding ages until it lay many feet beneath the accumulated debris. Then the coast gradually sank and the sea swept over the dead forest, and thus it is that amber is found both under the land and beneath the sea.

And from the insects and small reptiles perfectly preserved and buried in their "crystal coffins," the geologist is enabled to tell that some of the flies, bugs and small lizards of that primeval forest resemble those of our own age.

Amber is employed for a great variety of purposes. It is the basis of an excellent transparent varnish; it affords by distillation oil of amber and also succinic acid; and as the preparation of the amber varnish required that the amber be fused, all these products are obtained at the same time. Small pieces and scraps of amber are pulverized and burned as an incense in certain churches. The use of amber for the mouthpieces of pipes and cigar-holders originated in the East, where the pipe, like the calumet of the American Indians, is a special institution. The chibouque was passed from one to another, and as the amber was supposed to be prophylactic, or proof against poison, no fear of treachery existed, as it was supposed to be impossible to convey poison by this substance. It is undoubtedly owing to its perfect cleanliness and non-absorptive property that makes it grow more in favor with smokers each year. There is a difference of opinion as to which variety of amber makes the finest mouthpieces. In America the clear amber is considered the most valuable, while in Europe the cloudy material commands the highest price.

Coleoptera Found in Fungi at Peekskill, N. Y.

BY J. D. SHERMAN, JR., PEEKSKILL, N. Y.

Cercyon praetextatum, SAY.—One specimen, August 28th.

Silpha americana, LINN.—One specimen, August 17th.

Listotrophus cingulatus, GRAY.—Occasionally found.

Philonthus cyanipennis, FABR.—Very common: August.

Tachinus memnonius, GRAY.—Common latter part of August.

Boletobius cinctus, GRAY.—Very common latter part of August.

Oxyporus vittatus, GRAY.—Very common; August.

Tritoma humeralis, FABR.—Common in 1884; none seen since.

Tritoma unicolor, SAY.—Moderately common; August.

Hister foedatus, LECONTE.—Common; August.

Epuraea rufa, SAY.—Very common; August.

Pecadius helvolus, ER.—Common; August 19th.

Cryptarcha strigata, FABR.—A few; September 1st.

Onthophagus hecate, PANZ.—Common; July and August.

Ataenius stercorator, FABR.—Common; September 1st.

Geotrupes splendidus, FABR.—Sexes found at bottom of a winding hole communicating with the interior of the stem, and some three or four inches deep. With them was also found a pupa of the newly transformed male, which was .66 of an inch long, and white, with several short hairs.

Geotrupes, SR. (?).—One, of a blue-black color, August 26.

Hoplocephala bicornis, OLIV.—Common under fungi growing on trees in May and June.

Platydema excavatum, SAY.—Common in fungi under the bark of dead pitch pine trees in March.

Platydema ellipticum, FABR.—As preceding.

Tetratoma (?), SR. (?).—A jet black species, much resembling a *Mordellid*. August 17th.

Now is the proper time to send in your subscription.

Shall We Collect Sets ?

The following, in reply to Mr. Selover's article, "The Oological Collector," in No. I, Vol. II, of the COMPANION, we clip from the last issue of the *Oologist*:

As the last numbers of the *Oologist* and also of the NATURALISTS' COMPANION have contained articles in which the writers make it appear that all those who collect single eggs do so, not from a love of study, but from the desire to "show off," allow me to say a few words of defense through your valuable paper.

There may be advantages gained by collecting in sets, it is true, but I think that many oologists will stand by me when I say that as much can be learned from a collection of single eggs, properly kept, as there can from a collection composed of sets. The way I do is to take the egg and fill out a data blank the same as if I had taken the set. An egg register may also be kept, but if the data blank is properly kept there is no need for the register. In this way one can learn as much from a single egg as he can from a set, and is thus saved the additional trouble required to obtain the set.

Collecting single eggs has the advantage of being the more humane way, notwithstanding what Mr. Selover says to the contrary in the last number of the NATURALISTS' COMPANION. As oologists are generally accompanied by one or two of their friends on collecting trips, it will be seen that one nest of eggs would often satisfy all if they collected single eggs, while two or three nests would have to be robbed if they collected in sets. It is bad enough that the birds should suffer at all, and if we can learn as much from a single

egg as we can from a set, let us by all means collect single eggs.

Those who collect eggs simply as curiosities would do mankind and the birds a favor by turning their attention to stamps, tags or something else that would cause no suffering to any kind of harmless or beneficial creatures. If such persons cannot be made to desist by gentle means, laws should be enacted by which they can be punished.

As I am, in all senses of the word, a "young oologist," I should be pleased to know if there are any of the older ones who endorse my plans. If so, let us hear from them through the *Oologist*.

Yours fraternally,

F. M. PATTERSON.

Fort Madison, Ia.

The Proper Sizes of Shot.

BY FRED C. LUSK, HOLLEY, N. Y.

Seeing your warning in the last *COMPANION*, "Don't use too coarse shot," led me to write this, thinking it would be of interest to some of your many readers. I use for all specimens from the little hummer up to the size of the waxwing, dust shot, that is, No. 16, using three drams powder, and one half ounce shot. In using this size, it being so small, the wound closes and but little, if any, blood flows, and consequently you have a clean bird to work on. How often it is that we have birds brought to us to be mounted that are so badly damaged by shot, that it is twice the work it ought to be for the price we get for doing it.

Right here I will tell other collectors my experience with birds after being shot, that is, how to carry them safely, cleanly and separately. I use tin cones of different sizes, being left a lit-

tle open at the bottom, and drop the bird head down into it. I use no cotton in the throat, the small hole at the point of the cone lets out any blood or juices from the stomach, and the cone also keeps all feathers straight and smooth, which is a great help, as all taxidermists know. This is my plan, and I would be pleased to hear from other collectors as to their methods, through this magazine.

An Archaeologist's Discovery.

Halbherr, the archaeologist, who is at work in Crete for the Italian government, has found a number of votive offerings in bronze and clay in a cavern which is called after Jupiter, because he is supposed to have been born therein. Remains of half-burned ox and goat horns, bronze knives, and arrow-heads indicate that there was some sort of worship on the spot. There is an outer and an inner cavern with stalactites, stalagmites and a beautiful little river.

Eggs of the Summer Redbird in a Mockingbird's Nest.

BY W. W. WESTGATE, HOUSTON, TEXAS.

Some time ago, while out collecting, I saw a male Summer Redbird in a tree near by. Experience had taught me that during the breeding season they never strayed far from their nests, so I at once started to find the nest. It was a long, tiresome undertaking, but the bird was an available monitor that every time told me when going wrong; when I went in one direction the bird ceased its cry, but when I turned, it commenced with renewed force. At last, after a hunt of about half an hour, I found the nest, some fifty yards

from where I had first seen the bird. It was on a horizontal limb of a small oak, about ten feet from the ground. The female was on the nest, but as soon as I reached the tree she flew off and joined the male in begging me to leave their treasures alone. Hardening my heart, like Pharoah of old, I went on, and saw that the nest was precisely like that of the Mockingbird. This surprised me very much, for all the nests of the Redbird that I have ever seen were small, and composed almost entirely of grass. On reaching the nest it was plain to see that it was formerly the home of a pair of Mockingbirds, because it was lined with grass roots, which is an infallible characteristic of its nest. The nest contained six eggs, three of the Redbird and three of the Mockingbird. I only took one (I do not endorse the habit of collecting "sets") and left. It was very much incubated, but I succeeded in blowing it, and now have it in my cabinet. My supposition is that the nest of the Redbird was destroyed, and the female, being compelled to lay, took the first nest she happened to come across.

The Killdeer Plover.

(*Oxyechus vociferus*).

BY ERNEST GAMBLE, TECUMSEH, MICH.

The Killdeer is so called on account of its cry, which resembles the word killdeer. This bird is about ten inches long; extent of wings, twenty inches; bill $\frac{3}{4}$ inches long. The head is quite small; neck short; body rather slender; wings reaching to the end of the tail; feet long and slender. The bill is

black, and the feet grayish-blue. There is a black ring around the neck and a wide band of the same color on the breast.

The bird is common throughout the United States, being most abundant inland. They go South in September, and return quite early in the spring. I have read that the small flocks, when feeding, always post a sentinel to warn them of danger, but I cannot vouch for the truth of this, as I have never been able to see it myself.

Their chief resorts are new-plowed fields, the banks of rivers, and around marshy places. They feed chiefly on worms, grasshoppers and beetles. Their flight is strong and rapid, and their speed at running is very great. When undisturbed, they run along the ground and utter a murmuring note; but when frightened, they take wing and have a shrill, harsh cry.

They begin to build about the first of May, and rear two broods in a season. I have found fresh eggs on the 5th of May, and the latest set taken was on the 8th of July. Their nests are very simple, being only a hollow in the ground, about the size of one's hand, filled with fine chips or pieces of bark. The eggs are four in number, of a dark clay color thickly spotted with varying shades of brown and black. From about twenty specimens before me, I find the average dimensions to be 1.54 inches long by 1.12 broad. The nest and eggs are so near the color of the ground that they are very hard to find, and I have walked over a nest several times before finding it. A good way to find a nest is to go into a ploughed field and suddenly fire a gun, when the bird will often fly directly from the nest.

THE NATURALISTS'



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We request all of our readers to send us a description of their Collecting Excursions, their Finds, or any items they may think will be of interest to the readers of the COMPANION.

CHARLES P. GUELF,

EDITOR AND PUBLISHER.

Brockport, New York, U. S. A.

Office of Publication, Ward's Block,
Main Street, Brockport, N. Y.

RANDOM NOTES.

Lemmie Henry, Bonaparte, Ia., has our sincere thanks for some fine specimens of quartz geodes.

John Carmichael, publisher of the *Agents' Directory*, has removed from St. Raymond, Quebec, to North Bay, Ontario.

We would be greatly pleased if those of our readers who are interested in archaeology would contribute articles on that subject.

The *Naturalists' World*, of Ilkley, England, has just completed its third volume. May it still continue onward in the great and good work it is doing, is the sincere wish of the Editor.

We wish to thank our readers for the large number of contributions recently forwarded. We hope they will still continue to contribute, and thus add greatly to the interest of the magazine.

We would respectfully call attention to the advertisement of Mr. Frank B. Webster, on another page, and would recommend him to our readers as being both prompt and reliable. His goods are strictly first-class, and are sure to give satisfaction.

We have recently obtained from Mr. Frank Harris, of La Crescent, Minn., a fine English beagle dog, and would cheerfully recommend all those in want of a good hunting dog to him, as he has a supply of the best dogs in the country.

Mr. H. M. Downs informs us that on the evening of Dec. 17th, Rev. Geo. W. Perry, of Rutland, Vt., succeeded in throwing the light from a stereopticon on a screen through several plates of dendritic mica with beautiful effects, showing plainly and in the natural colors the intricate markings between the laminations caused by water, holding various mineral substances in solution, working its way between them. Pictures of various leaves and ferns were also shown, which were themselves exposed on the sensitive plates in making the slides, instead of photographing them. Every rib and fibre were clearly delineated with wonderful distinctness.

Fusibility of Cryolite.

A somewhat lengthy article on cryolite in last issue leads me to suspect its writer, Dr. Mason, is more acquainted with it as its character is described by authorities, than by personal practical work. I would like to ask if any one has ever suspected its fusibility is at a lower temperature when placed in the scale of fusibility than when placed in a candle's flame?

It has been my experience, since *Random Notes* noticed the fact, to be disappointed in its fusibility. I would like to offer a fine mineral as compensation for the best essay on the causes of variance in the fusibility of cryolite, if there are any, to any reader willing to experiment.

W. S. BEEKMAN,
West Medford, Mass.

Birds of Green County, Pennsylvania.

BY J. W. JACOBS, WAYNESBURG, PA.

I do not claim that this is complete, as there are from twenty-five to thirty-five unidentified species, including the warblers, vireos, creepers, sparrows, birds of prey, etc.

1.—*Hylocichla mustelina*, Wood Thrush. Common in swampy or damp woods. Breeds. Arrives about the middle of April; departs in October.

2.—*Hylocichla fuscescens*, Wilson's Thrush. Summer resident; breeds. Arrives last of April; departs in September.

7.—*Merula migratory*, American Robin. Very abundant summer resident; breeds. Arrives in March; departs in November. A number remain here throughout the winter.

11.—*Mimus polyglottus*, Mockingbird. Seen and heard occasionally; never breeds here.

12.—*Galeoscoptes carolinensis*, Catbird. Very common summer resident; breeds. Arrives first of May; departs in October.

13.—*Harporhynchus rufus*, Brown Thrasher. Common summer resident; breeds. Arrives in April; departs in September.

22.—*Sialia Sialis*, Bluebird. Abundant; breeds. Arrives in March; departs in November. A few remain during the winter.

27.—*Poliophtila caerulea*, Blue-gray Gnatcatcher. Common summer resident; breeds. Arrives early in April; departs the first of September.

TO BE CONTINUED.

CORRESPONDENCE.

While loading freight at the Nickel Plate depot yesterday (Nov. 9th.), I noticed English Sparrows flitting about my head, with strings in their beaks. I sat down and watched them a moment and found they were repairing a Pewee's nest over the freight house door. Do they breed at all seasons of the year? There is snow six inches deep here, so I thought this was a rare occurrence.

M. R. POTTER,
West Springfield, Penn.

As I have received many inquiries as to the description of coal fossils found in this vicinity, I take the opportunity of answering through the columns of your magazine. The fossils are found on the rock banks surrounding the town. They are found in masses of shale weighing from twenty-five to fifty pounds, which may be split open and both the impression and the

petrified fern may be seen. I have in my possession many species of ferns, also a few insects and two varieties of flowers shaped like a daisy: I also have specimens of the woods *Lepidodendra* and *Sigillaria*. I am going on an expedition to a new mine in a few days and if I find any more varieties I will let you know.

D. M. GROSH.

Shamokin, Penn.

—o—

I see you desire the readers of the COMPANION to express their views on the destruction of our birds. I think the main cause is the killing of birds for use on hats; but of course the taxidermist and the egg collector aid, though I do not wish to say anything against legitimate work. As local secretary, however, I shall do all in my power to aid the movement.

W. W. WESTGATE, Houston, Tex.

—o—

We clip this from a letter recently received from a subscriber:

"You might mention in your paper that I saw a Belted Kingfisher this day (Dec. 24th) flying south. I never noticed one so late in the season before. Where could this bird have been during the last cold snap of three weeks, when the ground has been covered with snow to the depth of several inches and the ponds, lakes and rivers are frozen over?

S. W. DENTON, Wellesley, Mass."

—o—

In April '86 I constructed a box and erected it on a post for the Bluebirds. In about five days a pair of the birds took possession and commenced to build. From this nest I took three sets of four eggs each, and one of five. Everytime I robbed it they would put a new lining in the nest and lay another

set. I did intend to take every set the old birds laid to see how long they would continue rebuilding the nest, until she had laid the fifth set, when I concluded that it was time the birds should rear a brood.

This is the 19th of November, as "cold as blazes," and still there lingers plenty of Robins, Meadow Larks, Chipping Sparrows, Mourning Doves, Black-birds and Song Sparrows.

J. W. JACOBS, Waynesburg, Pa.

—o—

We clip the following from a letter recently received from the secretary of Chapter 847A of the Agassiz Association:

WASHINGTON, IND., Nov. 25th, 1886.

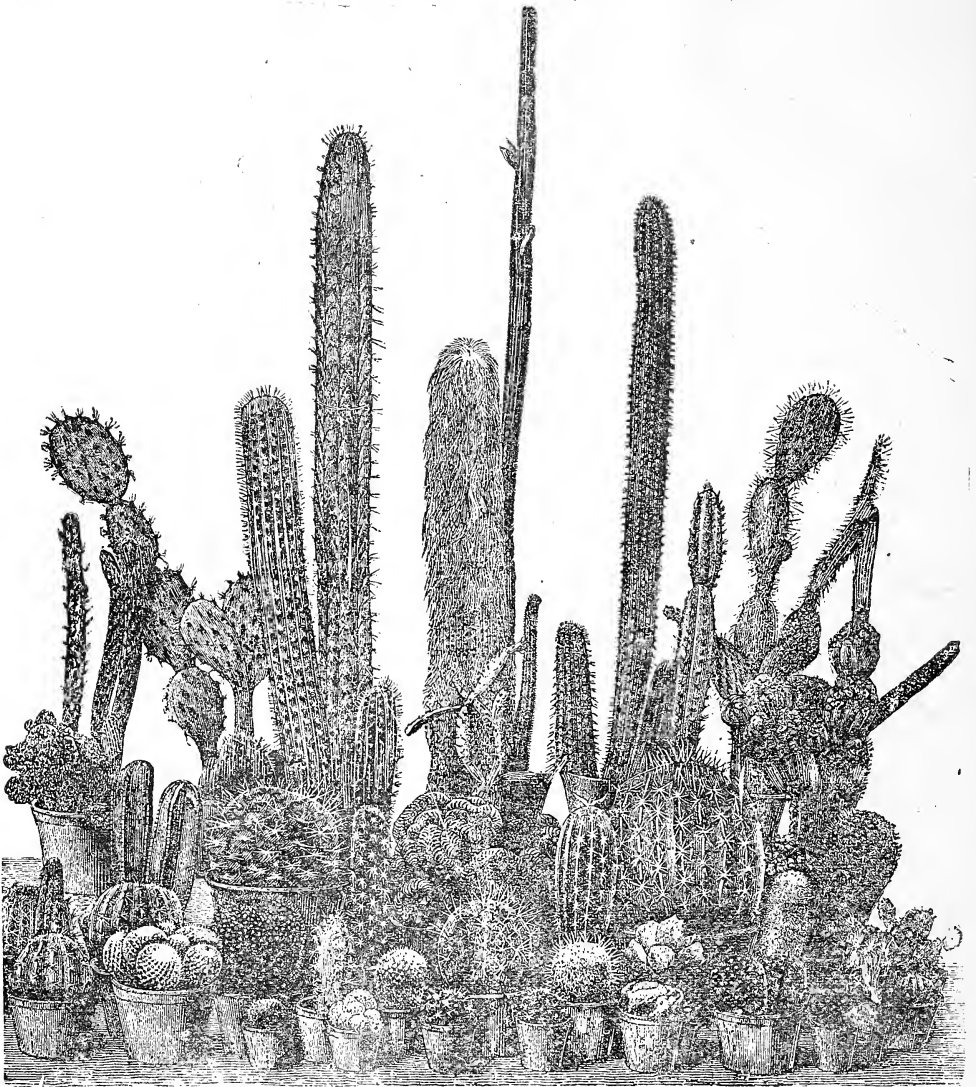
Dear Sir:—

"Chapter 847A is in a prosperous condition, with every prospects for further success. At present writing we have had our collections catalogued, and are steadily increasing in membership. So far, I have never come across a better paper, both in matter and typographical appearance, for the price, than the COMPANION. May your paper continue to remain as interesting, is my wish. We are especially interested in chemistry, and I have been slightly disappointed at finding no articles on that subject in your magazine. Hope you may succeed in obtaining something in that way; shall consider it my duty to supply the deficiency if you don't.

BEN. W. CLAWSON.

ERRATA.

In the article on Cryolite on page 38 in No. 3, it reads "a suffocating odor of *chlorine* is given off." It should have read *fluorine* instead of *chlorine*.



Cacti.

Cacti have much to recommend them to the lovers of the curious and the beautiful, the majority possess very valuable character—*i. e.*, they are easily grown, so easily in fact that anyone who can only devote a small space to them in his window may grow them successfully. In the dry and heated atmosphere of a room which is so trying to most plants they are perfectly at home, and their demands upon the attention of their host are so slight that they may be left for weeks, nay, months, without the smallest supply of water. Few people have an opportunity to see a collection containing most of the best varieties. It is by contrast with each other that they can best be displayed to advantage. To a lover of Cacti there is a real fascination in admiring the beautifully colored spines of many of the Echinocacti as well as of the Mamillarias. The blooming of *Cereus grandiflorus* is certainly a sight worth seeing. Some of the Mamillarias seldom grow more than a few inches in height, while many *Cereus* are found in their native haunts measuring upwards of fifty feet high. Many of the flowers possess a powerful and most pleasing fragrance. They vary much in size as well as in colors. Some of the *Cereus* will often produce flowers measuring twenty inches across. When the brilliantly colored rose, crimson, purple or yellow flowers are seen, the observer is literally charmed with them. The fruit, or seed pods, are very ornamental and in some cases are edible. That of *Echinocactus visnaga* is used as a lemon and a pleasant beverage is made of it. The seed pod of *E. simpsoni* is agreeable to the taste, remind-

ing one of a good-sized gooseberry. Of *Cereus speciosissimus* and *Opuntia vulgaris* the fruit may be eaten as well. They also add greatly to the beauty of the plant when not in bloom. We have seen specimens of *Mamillaria applanata* covered with over one hundred brilliant coral fruits, lasting for months. In *Echinocactus texensis* the large red seed pods are also much admired. *E. wislizenii* has fruit of a lemon color, which is also very pleasing. The spines generally form the beauty of the plant. An engraving cannot convey their beauty or diversified colors. When held to the light many of them show all the colors of the rainbow. Some have broad flat spines regularly ribbed, some straight, others curved, then again some are as sharp as needles, and more so. A few may be handled with impunity, such as *Mamillaria senilis*—as delicate as a ball of cotton, and *M. micromis* which looks like an embroidered button. Others are terrors to handle. Most of the Cactaceous plants are natives of North and South America, principally of Mexico. Only a limited number are found in South America. California, Nevada, Utah and Arizona produce some very fine species, while even in Montana we find some hardy varieties, and yet it is a curious fact that until recently it was impossible to buy from any one dealer in the United States more than fifty or a hundred varieties, while over a thousand varieties are known at the present time. To get these, some ten or fifteen foreign houses must be drawn upon, as it would require many thousands of miles and years of travel to collect even half that number in their native haunts. This fact naturally increases their value to some extent.—*Blanc's catalogue.*

Stibnite.

BY W. S. BEEKMAN, W. MEDFORD, MASS.

In accordance to a promise made in last issue, I was to give a description of the most beautiful metallic mineral in existence. This article will consist of that description, in a certain way. It will describe the mineral and give its name. As to portraying its beauties on paper, there is no power behind the pen adequate to fulfill such an undertaking. An illustration would convey its form better than words; but of its beauty—it is inconceivable, until seen.

With this fact in mind, many will ask, if about to give a description of the most beautiful of metallic specimens, why not give the article a heading with that specimen? It surely can have no reference to stibnite. Every tyro in collecting minerals will, or if not, should have, a good specimen of stibnite. It is a common and cheap mineral, very important in its relation to workable ores, and no collection is complete without its presence. But as to beauty, everyone on referring to the aspect of their specimen will wonder where the beauty comes in. It certainly has an attractive, cleanly appearance, generally pure, and free from matrix; but there are many others, as, for instance, the common iron pyrite, that far excels stibnite in attractiveness. The stibnite most widely circulated among collectors is generally from the New Brunswick locality: possessing a crystalline structure, of a cold, steel-grey lustre; one glance at the average specimen being generally sufficient for a complete recognition of its external appearance. The specimens awakens

our interest only as we are capable of recalling its associations. This is the case with all specimens of a tame aspect.

You may be exhibiting your cabinet to X, Y and Z. The individual associations that each will feel in regard to your specimen is measured in the proportion of his knowledge or insight into the properties and character of the specimen under consideration. It is quite impossible for all to be affected alike by a specimen—sympathies find no likeness, unless we consider those outside the margin of minute details, where there is a greater chance of finding reciprocation of identical feelings. But here the sympathies with a specimen, and by sympathies is meant the intelligent interpretations, are governed according to the temperament as well as intellectual development of the observer. These three persons can have entirely foreign thoughts from each other awakened by this one specimen; X may recall something he has heard concerning the specimens connection; Y has perhaps read a note on its uses; while Z may associate it with some other member of the family to which it belongs, having no knowledge of what X is acquainted with, or Y concerning Z's subject.

As before stated, power to convey to your minds a likeness of the specimen in all its magnificence is utterly impossible. Clear conceptions of objects can never be acquired by interpreting descriptions; neither can a portrait be conveyed by words, accurately describing structure, unless having been revealed by optical representation as well as by mental energy.

You would never describe to a mechanic a new design which you wished

imitated by his art. if you desired the production to be exactly as you described; but you would assist description by something in like circumstances that is more powerful than words—a plan, a picture, or a model.

Your kind Editor would be most happy to give illustrations with all contributions that would be materially benefited thus. It is not the Editor's fault that they are not forth coming, but your own. If every subscriber would secure a subscription from at least one of their friends, this valuable magazine would be one hundred per cent. better off, and with such an advancement, what rapid strides toward even excelling whose journals which are now considered superiors. As you have thus far failed to do this, be content to know that the specimen is beautiful because we say so, and glean what you may from the inadequate description following.

To be concluded in our next issue.

QUERIES AND ANSWERS.

F. B., Rochester, N. Y.—Both drawings sent are of arrowheads; your imagination pictured the face.

L. N. A., St. Paul, Minn.—Specimens sent for identification are: 1, flint; 2 serpentine; 3, calcite; 4, quartz; 5, orthoclase.

W. N. S., Geneva, N. Y.—Egg sent are: Wilson and Wood Thrush, respectively.

C. D. O., Waco, Tex.—Can some of the readers tell me from this description the name of the bird here described. Head, throat and upper part of breast, brown; lower part of breast and underparts, white; back, brown; wings, brown and white; tail, brown with white margin; the white on the tail is very conspicuous when flying. The eye is red; bill, almost black; length, 8 inches; spread, 9½ inches.

H. C. O., Waterloo, N. Y.—The nest and eggs described were, as you thought, of the Golden-crowned Thrush.

In October issue, Mrs. L. W. asks for color of Barred Owl's eyes. Live specimens that we have had have the iris a blue black or smoky black; so dark as to seem nearly black. Taxidermists use dark hazel eyes for mounted specimens, but of late we have been using the smoky black color, which is much more natural. These were furnished by Mr. F. B. Webster, of Boston.

Dickey & Allen, Ackworth, N. H.

We have a few specimens on hand which we will identify as soon as possible.

We wish to thank our readers for the many excellent articles recently sent us. Come again.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

FRANK BOLL, 15 Montrose St., Rochester, N. Y.—Would like some sand from Sandwich Islands; will give any thing of equal value.

G. F. GUELF, Brockport, N. Y.—I have a large quantity of choice minerals to exchange for birds' skins. Send list of skins for exchange.

W. H. PHILLIPS, 19 Bigelow ave., Cincinnati, O.—5 Cincinnati fossils, named, for 10 philatelic or natural history papers. Put name preceded by "From" on package and receive fossils next day.

W. S. BEEKMAN, W. Medford, Mass.—Books papers, magazines, curious, sea curiosities, minerals, fossils and a lot of useful things that will be given in exchange for books, minerals, fossils, fountain pen, etc.

ANSEL HILT, Warren, Maine.—A specimen of limestone for every mineral, fossil or petrification.

J. G. WAINWRIGHT, Waukegan, Ills. Fine rare specimens of coprolite, cabinet size, in exchange for a dime dated before 1875.

H. T. UPSON, Parkersburg, W. Va.—Will give fine Indian spear heads and arrows for U. S. copper cents and V nickles.

PHILIP SEIBEL, 735 O'Farrell St., San Francisco, Cal.—Starfish, sea urchins, serpentine and green or black slag to exchange for minerals or fossils.

ERNEST GAMBLE, Tecumseh, Mich.—Will exchange a small collection of old U. S. copper cents for best offer of birds' eggs in sets.

C. D. OLDRIGHT, Waco, Tex.—Birds in the meat to exchange. I have a compound microscope and slides (cost \$6.00) to exchange for birds' eggs in sets with data.

A. B. ROBERTS, Weymouth, Ohio.—Many varieties of first-class birds' eggs to exchange for Indian relics, good minerals, curiosities, fossils, etc. Exchange lists.

H. C. OSTRANDER, Waterloo, N. Y.—Collection of stamps consisting of 450 mixed foreign, 275 common U. S. postage, and 20 U. S. revenue to exchange for best offer in minerals or marine curiosities.

MRS. W. S. HAMMAND, Carthage, N. Y.—Chinese primroses, freesia alba, allium neapolitanum, new lemon, bronze and mammoth oxalice and cinerarias, all choice winter-blooming plants; also a large variety of other plants and bulbs to exchange for stuffed birds and choice sea shells.


W. W. WESTGATE, Houston, Tex.—I want specimens of *Geandina vanuxemensis* (Lea.), *G. truncata* (Gmel.), *G. parallela* (W. G. B.), *G. decussata* (Desh.), *G. bullata* (Gld.), and *G. texasiana* (Pfr.).

J. W. JACOBS, Waynesburg, Pa.—I have sets of Nos. 494, 278, 387, 270, 12, 13, 375, 278, 22, 516, 261, 154, 214, 139, 450. 25 varieties single eggs, arrow-heads and tobacco tags to exchange for eggs in sets or single.

G. E. WELLS, Ames, N. Y.—Specimens from Howe's cave, calcite, agates, calc spar, petrified woods, native woods, Indian pottery and pieces of axes, and many other things to exchange for fine minerals not in my collection, Indian relics, curiosities, etc. Correspondence desired with advanced collectors, also foreign, western and southern collectors

J. H. MERRILL, Wenham, Mass.—Vol. II *American Naturalist* complete, with index; a lot of story and natural history papers and magazines; two books on poultry raising, U. S. and foreign stamps, and other article for a printing press, Indian relics, minerals and curiosities. Write what you have to exchange.

C. S. MASON, 13 So. College, Easton, Pa.—Asbestos, calcite, calamin, emery, elba ore, franklinite, flint, geodes (iron), goethite, hydrozincite, iron ore, kaolin, lithographic stone, limonite, grenochite, mica, pyrite, quartz, red granite, steatite, tale, willimite, zinc blende, zincite, zincon in steatite in exchange for quartz geodes, chalcedony, agates, copper and lead ores, curious forms of pyrite and calcite, minerals of all kinds, arrow-heads and Mound-Builders' relics.

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To a Brown Thrush.

"As rich as neck-chains of white pearls,
Thy wonderful chants unto me!"
Thus, pout applauded dance-girls;
Weird singer, such praise befits thee.

Sing blithely, where blossoming rows,
Sweet-scented, embower endeared place,
Where, hushing the neighborhood, flows
Thy river of musical grace.

Could language embalm thy rare arts,
Could print voice thy singing, this page
Would thrill nature-worshipping hearts
Till time felt the palsy of age.

Enthroned on yon tall, wind-harp tree,
Thou warblest thy various tunes,
Re-echoing songs heard by thee
In days of lost Mays and lost Junes.

Apollo let thee sip the wine
Of fabled fount, music's own source:—
Thou'rt thrilled by the gift most divine—
Of singing—and curbless its force.

--Inter-Ocean.

EVOLUTION;

Its Phases, Theories, and Relation to
Religion and Modern Science.

BY "FRANCIS."

Continued from No. 4.

SINCE I made the statement that the question of Evolution, now so earnestly agitated, might be conclusively argued and settled without the least reference to the Scriptures, I have been met by several scientists who have rather laughed at the idea. But you will remember that I said I was about to make a somewhat bold

statement, and that I was willing to abide the consequences: so, when I have been questioned about my belief in this matter, I have stated my belief, and have as yet found none to tell me that it is groundless.

Suppose, for the time being, that science has sufficiently ratified the theory to warrant its acceptance; that the only opposing element is the inspiring word of the Creator. Were I to say, as too many men have said, that we must throw aside this Bible of ours, and take the scientific hypothesis as truth: were I to say, as it has been said to me, that the Bible is a very superstitious book, written in a superstitious age, and by a superstitious people; and that in this enlightened age it is not worthy of belief; were I to tell you this I should expect that you would be utterly disgusted with me, but I should expect to be more disgusted with myself. No! Rather than assert that we must believe science in contradiction to the Bible; rather than to say that we must even believe either one, to the contradiction of the other, I say most emphatically believe both. Science has never yet brought forward any grand theory and substantiated it, but that theory has proven a still stronger corroboration of the Bible. Why, it is only to the sceptical student that creation is a mystery; what to his mind is a most unsolvable wonder, is made perfectly clear to the christian

student, who takes into consideration the power of the Omnipotent. When the infidel evolutionist has to stop for want of evidence; where after² going back to the origin of life, he has to confess himself balked in his attempt to account for that origin, or tell how life originated, there the christian student finds renewed grounds for the strengthening of his faith. There the Bible steps in with the assertion that God created life, and clears up the whole mystery like a ray of light let into a darkened room.

It is a well-known fact that man can so combine two different species, either plant or animal, that the product of the combination is an entirely different sort of organism. He can, for example, so combine the seeds of two kinds of fruit as to produce something so vastly different as to defy recognition. The difference may often times be so great as to not only place the new production in a new species but in a new genus as well. Now it must be evident that this new plant, this new species we will call it, is an evolution; that is, it is a development, the result of the combination of the two parent species. Had those species not been forced to combine, in all probability the new species would never have originated. But, though it is an evolution or development, there is one agency that we have omitted; an agency, too, that has a most important bearing upon the subject in consideration. Those two plants, or seeds, did not combine of themselves; left to themselves they probably never would have united. But an agency having power over them *made* them combine, and that agency was *man*; in other words, *man created* the new species, and the plant so developed is no less an

evolution than a creation. And has the Creator of the universe less power over his created beings than man has over these plants? Nay, has he not far more power over his creatures, for we must acknowledge that what little influence or power man may exhibit, is given him by his all-powerful Creator.

Now then, evolutionists tell you that they can go so far, but still they lack some links in their chain of evidence. Studying both the living and fossil creation, they find many links, many facts, that seem to indicate that a series of developments has characterized the growth of the animated creation to its present condition, but what has puzzled and distracted the brains of the supporters of the hypothesis has been to bring about natural conditions under which there shall be a spontaneous outburst of life, and from that a gradual ascending scale of organism. To this end many a laboratory has witnessed experiment after experiment, all kinds of gases, all degrees of heat, all degrees of pressure from an absolute vacuum, have been used, and all of no avail. Ignoring entirely the existence of an Almighty, poor human intellect and ingenuity has attempted to accomplish those things possible only to God himself, and the result has been doubt, confusion, failure. It must be plain to all that God has it in his power to so change and combine species as to produce something entirely new, even as man did in the case referred to. It must also be plain that though the outcome of the combination would be an evolution, it would be no less a creation; and when the Bible declares that the Lord God *created* all things, it *does not* necessarily demand the rejection of the theory of Evolution. Although the

world and all its inhabitants are declared to be created, there is nothing in the Bible to tell us in what manner the creation was accomplished; and we are left free to find out for ourselves the method employed.

Now that we have thus briefly considered this phase of the question, and have seen that the discussion of the theory, and its scientific bearings, need not involve the authenticity of the Bible, we can go on and investigate the question to its fullest extent.

To be continued.

From Texas.

On November 24th I shot a Yellow-billed Woodpecker, which had a cedar berry in its gizzard. It must have been very hungry for it had nothing else. I did not know that woodpeckers would eat cedar berries.

Last June, while out collecting, I found a Mockingbird's nest, which contained three young, and one egg found among the outer twigs, which proves that they laid the eggs before the nest was completed. On the same day I found a curious set of the same species. There were four egg, three of which were of a green color, spotted thickly with reddish-brown spots, about the size of a No. 4 shot, all over the egg. The remaining egg was of the usual bluish-green color, spotted, more thickly toward the larger end, with reddish brown and lilac. This set is now in my collection.

Sometime in 1885 I found a set of eggs of the Lark Finch, four in number, which were white tinged with reddish brown and spotted with dark reddish brown and a few lines and dots of black. Another one that I have has

only a few small black spots and no lines. The usual color is white, with spots, blotches and zigzag lines. They greatly resemble the eggs of the Baltimore Oriole, although more spherical.

The negro boys around here kill any kind of birds, especially Robins and Cedarbirds, to eat. They are generally armed with catapults and do good execution. I have known them to kill birds like Chickadees and Warblers and eat them. I think the killing of song and insectivorous birds for food or sport ought to be stopped; and also the robbing of nests to "show off" the eggs.

CHAS. D. OLDRIGHT.

Waco, Texas.

Destruction of Song Birds.

I think as does Mr. Westgate, that the main cause of the destruction of birds can be laid on the shoulders of the hunter who kills them to adorn (?) the hats of ladies. Unlike the taxidermist, they kill every specimen they can get within range of their pesky guns. Snakes may be added to the list of destroyers, as they like bird meat very much, and can eat as many little birds as the taxidermist mounts. As to the taxidermist, I believe he is not doing wrong when he kills birds to mount, as this is about the only way one can study the color, shape, size, etc. of our birds. The oological collector, I think, has but very little to do with destroying our song birds, as most all birds, when robbed of a set of eggs, will immediately set about building another nest, and I know of several instances where the bird has laid from two to six sets in the same nest; but of course there are a great many birds which will not lay a second set of eggs the same season, and in such cases the oological collector may be added to the list of bird destroyers.

J. W. JACOBS.

Waynesburg, Pa.

An Insectivorous Plant.

BY GEO. E. BRIGGS, PEEKSKILL, N. Y.

Many persons have read with much interest accounts of insectivorous birds, but have not realized the fact that there are members of the vegetable kingdom around us that devour insects and other minute animal life. But such has been found to be the nature and character of the Sundew family, and especially the genus *Drosera*. The principal representative of this genus is the species *Rotundi folia*.

This plant, commonly called the Round-leaved Sundew, is found in peat bogs and poor soil, such as can only sustain sphagnum mosses and the like. It is chiefly met with in the northerly regions. The flowers are small and white and bloom during July and August. The most peculiar characteristic of this plant is the part taken by its leaves. They are usually from two to six in number, and generally spread out radially and horizontally from the scape's base. The leaves of this species, as the name indicates, are somewhat rounded and concave. The upper surface of the leaf is covered with what appears to be glandular hairs of a purple color, though the leaf itself is of the usual green. These hairs, or tentacles, as they are usually called, though very short in the centre of the disk, grow longer as they approach the margin, where they bend backward. They seem to be prolongations of the leaf itself instead of ordinary hairs belonging to the epidermal system.

If a small object be placed upon the centre of the leaf, the impulse is transmitted to all the tentacles, and soon the object is clasped by every one of

the hairs. This process takes from one to five hours, according to circumstances, as the age and vigor of the leaf, the size of the object, etc. The object, no matter where it falls, is first carried to the centre of the disk and then goes through the regular process, being all this time held fast by the viscid secretion of the glands.

The time during which a leaf remains incurvate, or the tentacles continue to be inflected, varies, and depends upon the nature of the prisoner. If the captured prey is capable of yielding nutriment to the plant, the leaf much longer, remains incurvate than when the object is not nutritious. After an interval of from one to six days the hairs again expand and the plant is again ready for another victim.

The natural prey of the *Drosera rotundifolia* is insects, though the leaves may be fed with meat, albumen and various liquids, and have actually been known to die from dyspepsia, as it were, from imbibing too much cheese. At the end of each tentacle is a gland which secretes a drop of viscid substance. This is not in the least affected by the sun, though its hot rays soon dry the real dew resting on the plant, consequently its popular name of Sundew.

The many experiments made upon this plant, and the great amount of investigation given to the subject, has proven that the tiny roots of the Sundew serve simply as a means of imbibing moisture for the plant, while the real food is obtained by means of the foregoing process.

Surely this is a curious plant. What a close relationship there seems to exist here between the animal and vegetable kingdom. It would appear that

this was a common point of blending instead of that point of lowest life, where animals and plants cannot be distinguished. It is not at all unlikely that most of the readers of this magazine have seen the *Drosera rotundifolia* and noted its 'curious acts; and to those who at some future time may observe it, especially in its native haunts, I would say that it will well repay them to watch and note the curious phenomena attending its existence.

Origin of the Domestication of Animals.

BY C. S. MASON, EASTON, PA.

When we consider the immense difficulties which man must have encountered in subduing such stubborn animals as the wild bull, so swift as the horse, so fierce as the dog in its natural state, we see the greatness and power which he possesses. We may well wonder how he could tame these wild creatures and not only teach them to become useful allies and useful servants but to become trustworthy friends. It has been said, and well said, too, that animals could exist without man, whereas man could not exist without animals. If we read of the beginning of the world we find the last statement correct, for after having made all manner of beasts, God made man. What need had the animals of man? Nothing; they could get along without him. It is true that those which have been domesticated and cared for have gained, while those who have never felt the power of man have been the losers. But man! Does he need the animals? Most assuredly. He is a dependant creature at least. People, however, are apt to forget the innumerable difficulties which may have long interfered with the entire subjugation of these animals which we

call domestic. This has taken many long years of patience and toil. Still in mastering these dumb creatures and compelling them to do his will, man has shown himself to be the ruler of the brute creation. That all beasts must become subservient to his will. For example, go to any show of performing animals. They are made to go through various evolutions at the word of command, and they know as well as human beings when they fail, and slink away disgusted at their failures. Many conjectures have arisen among scientific men as to what order of animals were first trained and used by man. Most all agree, however, in placing the dog first. Prof. Steevstrup of Copenhagen proves very clearly and forcibly in a clever way that the dog co-existed and shared the ups and downs of life with prehistoric man. After having opened a bone cavern he noticed that some of the bones were gnawed in a peculiar manner. He procured similar bones and gave them to his dogs to gnaw, and strange to say, when he examined them, saw they were mutilated in the same manner as those taken from the cavern. To give due credit to *Canis familiaris*, he was and is a great help to man. But for him man could hardly have tended his flocks and herds which were his sustenance. The dog is a noble friend. After the dog, in the order of their usefulness, comes the horse, ox, goat, sheep, pig, reindeer, rabbit, birds, fishes and cat. These are all contemporary with man, as is proved by the finding of their remains in the same mounds or heaps (kitchen middens or shell heaps) as his. These remains show that they were similar in form and general characteristics as those of the same kind of the present day. Some of our modern breeds differ from their predecessors, the difference being caused by dieting and cross-breeding. A different arrangement of some of its organs, its having hair or not, or anything different from the parent stock makes another breed.

Ozocerite;

OR MINERAL WAX.

BY DR. B. F. MASON, SAN LEANDRO, CAL.

Ozocerite is like wax, or spermaceti, in appearance and consistency, and is usually colorless or white when pure; but often look green, yellowish or brown. The name ozocerite is derived from the Greek words, *ozo*, smell, and *keros*, wax, in allusion to its odor and appearance. It is greasy to the touch, and fuses between 50° and 63° centigrade. It is one of the hydrocarbon compounds, and occurs in coal or associated bituminous deposits; that of Slanik, in Molotavia, being beneath beds of bituminous clay shale, in masses of from forty to a hundred pounds. It is also found at the foot of the Carpathian Mountain, in Galicia, Austria, near beds of coal and salt, and in Boryslaw in bituminous clay associated with beds of lime.

The first deposits of ozocerite found on the American continent were discovered in Mexico. It was discovered in that country while boring for oil, and though at first the operators were ignorant of the properties and value of the pulpy stone through which they were piercing, its oily and wax-like appearance attracted their attention, and they carried several specimens to a chemist. He immediately informed them that the mineral was ozocerite, and appraised them of its value. Arrangements were at once made for placing the valuable mineral upon the market, and soon large quantities were transported to Boston, where it is used in the manufacture of a fine and hard finish varnish.

In the United States, ozocerite has been discovered in and adjoining Sold-

iers' Home Canon in Utah. The south side of the canon is composed of bituminous shale alternating with gray clay containing mineral oil. In these strata of clay are found vertical seams of ozocerite, from six inches to two feet in thickness and about forty feet distant from each other. The purest ozocerite from this formation yields, by analysis, 65 per cent. paraffin wax, 25 per cent. heavy oil, and 10 per cent. residue.

In the oil bearing regions of north-eastern Utah—bounded on the north by the Uintak Mountains and on the east by the Wahsatch range—deposits of ozocerite have been frequently found, but varying greatly in quantity.

The oil bearing shales of this region have been folded in many places by upheavals, and their edges exposed by denudation, thus permitting a study of the underlying as well as the overlying beds. Under these oil bearing shales is a thick bed of fresh-water fossils of the Tertiary period. This formation of fossil shells would indicate that the oil is of animal origin. A strange feature of these beds of oil shales is that in some localities they are rich in oil but poor in wax, while in others they are rich in wax but poor in oil, and again in other places the exudations are composed of asphaltum. Why this is so, is at present a very tantalizing problem for the geologist to solve. By a careful scientific examination of the fossiliferous beds underlying the varieties of oil-bearing shales might tend to explain the subject.

As yet no deposit of ozocerite has been found in this Tertiary basin in Utah that equals in richness of purity the mineral wax found in Galicia in Austria. But scientific explorations in this wonderful and promising region

may in the future be productive of valuable discoveries.

Ozocerite has many uses in the arts and sciences, and is very valuable, commanding from \$2,000 to \$2,500 per ton. It is employed in the manufacture of excellent candles; also medicinally in a certain class of skin diseases, and it is further used in the production of telegraphic insulators. Recently it has been used in large quantities in Vienna, in a great variety of applications. In addition to its use for illumination, wax pencils are made of this material in that city, and are employed for marking and writing on wood, linen, cloth and paper, and as a substitute for chalk for the blackboard. The writing made by these pencils is not obliterated by moisture, acid or friction. On the Transcaspian railroad in Russia, approaching Merv, it is claimed that about \$300 a mile is saved by the use of ozocerite ties. When partly purified and melted and mixed with limestone and gravel, the ozocerite, which is quite abundant in the vicinity of the railroad, produces a very good variety of asphaltum. This mixture is pressed into shape in boxes, and gives ties which retain their form and hardness even in the hottest weather.

Remarkable Nests.

BY C. D. PENDELL, WAVERLY, N. Y.

The graceful pendant nest of the oriole, the dainty chalice of the humming bird, the mere excavation of sand as made by the ostrich, or the innumerable and varied forms of nests constructed by the hosts of the feathered tribes, each and all present a remarkable adaption to the individual require-

ments of the builder. But there are certain extraordinary forms which have been described by travelers, that are especially deserving of notice on account of their great size or peculiarity of construction.

First in regard to size may be mentioned that of the mound-building megapodius, a bird of Australia, which in color and size resembles the partridge. A nest of this bird measured by the ornithologist Gould, was fourteen feet high and had a circumference of one hundred and fifty feet. "Compáred to the size of the bird the dimensions of such a mountain are almost prodigious, and we ask how, with its beak and claws only, for pickaxe and entire means of transport, it contrives to get together such a mass of materials!"

The immense structure is constructed by first getting together a thick bed of leaves, branches and plants, the bird being guided in making this collection by a wonderful chemical instinct, selecting only such matter as will in fermenting, by the heat thus generated, hatch the eggs without a tendency to cause their decay. After having gathered sufficient vegetable matter, it heaps up earth and stones above it, and in such a manner as to form "an enormous crater-like tumulus, concave in the middle, the place where alone the materials first collected remain uncovered."

The bird having completed its herculean task, deposits its eggs (usually eight in number, and about the size of a swan's) in the centre of the nest among the vegetation left uncovered. They are placed in a circle at equal distances apart with the small end down. This done, the megapodius gives no further attention to its nest or offspring. The young knows how to nourish itself from

birth. When it breaks the shell it throws off the leaves that cover it, mounts the crest of its birthplace, dries its wings, (for it is full fledged,) gives a few flaps, and "having cast a disturbed and inquisitive look upon the surrounding country, the feeble bird takes its flight into the atmosphere and quits its cradle forever."

Another Australian bird, the tall-galla or bush turkey, whose appearance is similar to the common turkey though somewhat smaller, builds a nest equal in size to a large haycock. The material is collected by grasping the grass with one foot and hopping along on the other until the bird arrives at the prospective domicile, where it deposits the grass, until after many journeys, the nest is completed.

In respect to ingenuity of construction, the social grosbeak of Africa, excels all of its kind in the complexity of aerial architecture. This little bird, of similar size and appearance to the sparrow, congregates in vast numbers which unite in building one immense nest. There are sometimes more than six hundred birds inhabiting this elevated dormitory, or more than three hundred compartments to the nest. This abode has the appearance of an enormous umbrella of which the trunk of the tree is the handle. "One of these nests," says Patterson, "I had the curiosity to break down, so as to inform myself of its internal structure, and found it equally ingenious with that of the external. There are many entrances each of which forms a separate street with nests on both sides at about two inches distant from each other."

The nest of the tailor bird, less remarkable in regard to size, is in one respect the most remarkable than that

made by any other member of the feathered race. The bird, selecting a plant with two large leaves, gathers cotton or similar material, and spinning it into a thread by means of its slender mandibles and delicate feet, then, with its bill for a needle, sews the leaves together: and within the compartment so formed weaves a delicate nest, which is thus concealed from the observation of its enemies.

Far less ingenious, the nest of the korwe is to curious not to deserve mention. The female having entered her breeding place, the cavity of some tree, the male plasters up the entrance, leaving only a narrow slit exactly suited to the form of his beak, through which to feed his mate. The female lines the nest with her own feathers, and remains by her young after hatching until they are fully fledged. During this time, from two to three months, the devoted husband provides food for the entire family, reducing himself by starvation meanwhile to such a degree that a sudden lowering of the temperature is sufficient to cause his untimely death.

The nests of that peculiar swallow, salanganes, which inhabits the coast of China and the neighboring islands, are affixed by thousands to the inaccessible cliffs and dark caverns, and the gathering of them furnishes profitable employment to large numbers of the inhabitants. They are composed of a glutinous material resembling isinglass which is composed of certain seaweeds partly digested and afterwards disgorged, mixed with the digestive fluids of the stomach.

Among aquatic birds, the dabchick or grebe constructs the most curious nest, hatching, as it does, its young

upon a regular raft. Constructing its nest of weeds, moss, grass and other vegetable matter, often mixed with mud, the female floats tranquilly upon the surface, the strange craft rising and falling with the ripples, or wafted by the light breezes that blow over its secluded retreat. Though probably at first anchored to some plant rising from below, being often found in that position, it frequently happens that they become detached and "if any intruder happen to discover her, if anything threaten her safety, the wild bird plunges one of her feet into the water, and makes use of it as a paddle, with which she transports her dwelling to a distance.

Another peculiar nest, which is not a nest at all, is that of the Patagonian penguin, which lives amid the waves, rocks and ice of the frigid Antarctic zone. Like the marsupialia among mammals, which conceal their young in a ventral sack, the female penguin carries her solitary egg in a pouch formed by a fold in the skin of the abdomen, and there holds it so firmly that as she leaps, and sometimes falls, from rock to rock, the egg remains unharmed until hatched. To purloin the egg from this singular receptacle it is necessary to engage in a regular battle, not only with the female but also her devoted mate, who, at the first alarm, rushes to the spot and fights so furiously that success for the aggressor can only be secured when the noble bird sinks dead or totally disabled.

Wonderful indeed is the instinct with which wise Nature has endowed her creatures, and to the observing mind its development is everywhere present in forms as curious and remarkable as those just described.

"Wheresoever the naturalist turns his eye, life or the germ of life lies spread before him."

Field Notes on some Birds of Central Texas.

BY CHAS. D. OLDRIGHT, WACO, TEXAS.

Waco is in the centre of McLennan county, Texas, on the Brazos river, near where the Bosque river empties into it. The northern half of McLennan county is mostly covered with a growth of oaks, interspersed with farms, while the southern part is mostly farms and prairie country; the bottoms of the Brazos and Bosque rivers are well wooded, and the smaller streams usually have a fringe of trees on the banks. The mesquite tree (*Acacia glandulosa*) flourishes in places where the timber has been burnt down, and also on the prairies to some extent. The cottonwood is the most common tree along the streams; the others are oak, cedar, hackberry, elm, willow, walnut, pecan, etc. I commence my notes with the

Mockingbird, (*Mimus polyglottus*), this bird is very common and tame, and is found all over the city, building its nest in trees by the road-side, in yards, etc. It is seldom found in the thick woods, staying around more open places such as thickets of bushes, orchards, in the mesquite trees, which never grow very closely together, in hedges, etc. Their habits are all so well known that it would be a waste of space to describe them here.

Cardinal Grosbeak, (*Cardinalis virginianus*), which is equally common, is to be met with in every thicket, and its song may be heard from February until August. The only other species

of Grosbeaks that I have noticed here is the Blue Grosbeak (*Guirica caerulea*), which is seldom seen, being both rare and shy. A nest containing four eggs of, I believe, this species, was found on August 12th, 1885. One of the eggs is in my possession; it is light bluish-white, and not quite as large as those of *C. virginianus*. The nest was in a peach tree and was built like that of the Cardinal Grosbeak; the bird was not seen. The nest was found by a boy about seven miles from Austin.

The Common Crow, (*Corvus frugivorus*), is common but very shy. The crows assemble in large flocks in the winter and resort to the fields. I have often seen over a hundred in a flock. They nest in the thickest woods that can be found, and usually build in the tall cedar trees.

The Blue Jay, (*Cyanocitta cristata*), is common in the mixed woods, and is always ready to drive all other birds by its screeching.

The Red-bellied Woodpecker, (*Centurus carolinus*), is the most common woodpecker found here. Its nesting place is generally a hole dug in a dead tree. The hole is usually about six inches deep; and the eggs, five in number, are glossy white, with a tinge of pink before blown, owing to the yolk showing through the shell.

To be continued.

Stibnite.

BY W. S. BEEKMAN, W. MEDFORD, MASS.

CONCLUDED.

The stibnite now under consideration is from a Japanese locality, which has been jealously kept secret from foreigners, as even their whole country was

until a recent day. The specimen weighs twenty five pounds; perfect cabinet shape, and large enough for a table. Specimens of smaller size and even fragments will represent the individual lustre as well as the larger specimens, only lacking, of course, combined effect.

A confused medley of black and white is the first impression produced from a distant view of our specimen. As it comes nearer to a focus this medley resolves into a series of long, stout crystals covering a mass of drusy milk-white quartz, which in places where, by the overlapping of crystals a space is open, seems to show, its discontentment with the back view and protrudes itself out through these loop-holes, resembling, with its many facets just peeping above, the many faceted eyes of a trilobite as they now appear in their strong gaze on the shelves of our cabinets. The steel-gray crystals, often from six to twenty inches in length, are of an exceedingly brilliant metallic lustre. Their brilliancy is not equalled elsewhere in the mineral kingdom.

The dazzling lustre is unusually cold in its depth, and excites our admiration from the fact of its great purity. Not a break occurs in the crystal's face, not even the lines of terminal growth impair its splendor, but so perfect are its faces that one's image is reflected as from a plate mirror. Scientific interest is awakened in the crystal from the fact that over thirty new angles were discovered in this specie by Prof. Dana.

Terminations are generally perfect, and the number of planes now known number eighty five. In case the crystals are detached, as some of the larger ones are, the contrasting influence of the milky quartz is not materially felt

as even in this form deficiencies from perfection are not to be thought of, and genuine admiration will always preclude the possibility of criticism.

Stuffed Spiders.

When it comes to a real live, energetic, ugly, vicious, poisonous spider, Southern California can enter prize animals at any fair. The most precious trophies the tourists bears away from this coast are, in all probability, the neat cards decorated with these monsters of the insect world. Every one in familiar with the trap door and nest of this cunning but ugly creation, and of which strange little habitations every adobe ranch is full. So densely populated with these beautifully lined tunnels are some of the sunny, quiet valleys among the foot hills, that close inspection will reveal their almost invisible trap doors hardly a foot apart. Yet, in spite of this, hardly a living animal will be seen. There is a legitimate demand for prepared specimens, both at wholesale and retail. When first brought in they are deprived of what life is left in their bodies by poisonous fumes or other application of poison. After the taxidermist has made sure they are quite dead—a wise precaution—he cuts them open on the under side and, removing the loose matter therefrom, carefully stuffs them with cotton. This stuffing process is quite a delicate operation, and requires no little knack to perform neatly and successfully, without injuring the animal, and bringing it back to its nominal shape and size. A humming-bird would seem to be about as small an object as could easily be put through this painstaking operation, let alone an insect even of

the size of a tarantula. This having been completed, the spider is placed upon a board and properly held in position by pins, one through the body and one in each foot, and set in the sun to dry.

The sale of them in Santa Barbara is carried on both at wholesale and retail, several parties carrying on the business, the supply seeming never to crowd the demand. In spite of their great numbers, few instances occur where people have ever been bitten by them, the tarantulas generally being more anxious than the other party to get out of the way.

Sounding Crater Lake.

A party sent out by the geological survey, under command of Capt. Clarence E. Dutton, of the United States army, has succeeded in reaching and making a complete survey of Crater Lake, in Oregon, a body of water whose shores, with the possible exception of one point on the south, have never been touched by the feet of white men. The party's boats were hauled a hundred miles by mule teams, dragged by a detail of soldiers up the snow-clad sides of the range which surrounds the lake and lowered by ropes to the water 900 feet below. One hundred and sixty soundings were made, the result of which show the general character of the lake bottom. Two large submerged cinder cones were found, respectively 800 and 1200 feet high, the rest of the bottom being flat. Captain Dutton believes this to be the deepest body of fresh water found on the continent. The greatest depth attained by the sounding was 2,005 feet.

A Bird's Foresight.

In California the woodpecker stores acorns away, although he never eats them. He bores several holes, differing slightly in size, at the fall of the year, invariably in a pine tree. Then he finds an acorn, which he adapts to one of the holes prepared for its reception. But he does not eat the acorn, for, as a rule, he is not a vegetarian. His object in storing away the acorns exhibits foresight and knowledge of results more akin to reason than to instinct. The succeeding winter the acorn remains intact, but, becoming saturated, is predisposed to decay, when it is attacked by maggots, who seem to delight in this special food. It is then that the woodpecker reaps the harvest his wisdom has provided, at a time when, the ground being covered with snow, he would experience a difficulty otherwise in obtaining suitable or palatable food.—*Science Series*.

A Reply.

SAN LEANDRO, CAL., Jan. 29, 1887.
Charles P. Guelf.

Dear Sir:—

Mr. Beckman's somewhat sweeping criticism in the last issue, leads me to suspect that during his *personal practical* work he has been thrusting into the flame of a candle a piece of limestone or dolomite, which some one informed him was cryolite, with the result that it did not melt.

I have had a practical example of Mr. Beckman's identification of minerals!

Very truly,

B. F. MASON.

The Intelligence of Birds.

Dr. Charles C. Abbott describes in *Science* some interesting experiments on the intelligence of birds. When he girdled branches on which birds had built their nests, and thereby caused the foilage to shrivel up so that the nests were exposed, the birds abandoned the nests, although they had already laid their eggs. But in a case in which the nest already contained young birds, the old birds remained, notwithstanding the exposure of the nest, until the young ones were able to fly. He placed a number of pieces of woolen yarn—red, yellow, purple, green and gray in color—near a tree in which a pair of Baltimore Orioles were building a nest. The pieces of yarn were all exactly alike except in color. There was an equal number of each color, and the red and yellow pieces were purposely placed on top. The birds chose only the gray pieces, putting in a few purple and blue ones when the nest was nearly finished. Not a red, yellow or green strand was used. Dr. Abbott concludes from his observations of the building of bird's nests that the female bird is exacting, obstinate and tyrannical, and not at all disposed to give in to the wishes of her lord and master.

The site of the nest is selected after careful examination of suitable localities by both birds.

A Kentucky coffee tree was felled a few years ago in Montgomery Co., Kas. which measured five feet in diameter and eighty feet to a limb. It was, we think, the largest tree of its species whose size has been recorded.

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CHARLES P. GUELF,

EDITOR AND PUBLISHER.

Brockport, New York, U. S. A.

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RANDOM NOTES.

Mr. F. C. Lusk, of Holley, N. Y.,
reports seeing a Bluebird on Jan. 28th.
This is rather a early arrival.

With regret we record the suspension
of *Random Notes on Natural History*, for
three years published by Messrs.
Southwick & Jencks, Providence, R. I.

By a mistake in the advertisement
of Mr. F. B. Webster, of Boston, Mass.,
in last issue, the price of Ostrich eggs
was quoted at \$1.00, whereas it should
have been \$1.50.

Mr. E. H. Griffith, A. M., F. R. M.
S., of Fairport, N. Y., has our thanks
for a programme of the meeting of the
American Society of Microscopists at
Chautauqua, N. Y., August 11 and 12.

Mr. W. K. Moorehead, of Cincinnati,
Ohio, informs us that he is going to
return to college next spring to finish
his course and will be at his old address.
Granville, Ohio.

Mr. W. S. Beekman, of West Med-
ford, Mass., informs us that he is en-
gaged compiling a "Guide to Popular
Mineralogy," and "The Aesthetical
Chemistry." The minerals will be il-
lustrated with colored engravings.

The earthquake has deprived Georgia
of one of her natural curiosities. The
"Shaking rock" will shake no more.
For over a hundred years it has been
an object of curiosity to the people of
Oglethorpe county. The earthquake
has shaken it off its pivot, however,
and it now rests solidly on the bosom
of the earth.

Prof. Richard A. Proctor maintains
that most of the meteor streams with
which the earth comes in contact are
derived from the earth itself; that is,
thrown off by volcanic action at a time
when the internal forces of our planet
were sufficiently active to give them
the initial velocity requisite to carry
them beyond the earth's attraction,
some twelve miles a second. Comets,
which he regards as the parents of me-
tor streams, he thinks may have origi-
nated outside our solar system. Most
of the comets whose orbits belong to
our system he thinks originated in the
larger planets. The sun is now per-
haps giving birth frequently to comets
which probably pass beyond the limits
of its attraction.

Sparrows vs. Caterpillars.

The sparrows have completely disappeared from Bethlehem, Pa., as a result of the persistent war upon them. A paper of that town says the consequence is, thousands upon thousands of caterpillars. "One cannot walk through a grove or even along the street without treading upon a dozen or more of insects, and having an equal number fall upon his person. We have noticed whole sides of buildings covered with these little objects, and even the interior of our houses are not free from their incursions. It is the natural result of the wholesale and barbarous destruction of our feathered friends, the sparrows." Waynesburg is literally alive with sparrows, and also with caterpillars, and it is our opinion that the sparrow is doing nothing but making war on and driving our native birds away. They should be exterminated at once.

The California Road-runner.

While traveling on horse-back through some of the little valleys of the interior of Southern California I have often, in passing by bushes near the road, heard a rustle and seen an olive-green bird, with white breast, come fluttering out and go rushing on ahead as though challenging a race. This is the "road-runner," and if the challenge is accepted the bird will win unless the horse is very swift. The road-runner will not try to fly away, as most birds, but will skim along at a rapid rate. The bird belongs particularly to California, and is not found east of the Sierra Nevada mountains. It is about two feet long,

its tail being about half its length. The tail feathers are green, tipped with white. The road-runner has one great enemy—the rattlesnake—and the bird has an ingenious way of getting rid of it. Its plan is to wait until it sees the snake lying asleep curled up in the sun. Then he softly collects cactus enough to make a prickly hedge around the snake. After a while the rattlesnake wakes up, tries to uncoil itself after its nap, but he cannot do so. A sharp spine pricks his head, another runs into his side, another thorn galls him on the other side, and whichever way he moves he feels some stinging pain. This soon makes the rattlesnake very angry, and, as he cannot find anything else to strike, he raises his head, opens his mouth, and strikes at himself, burying his poison fangs in his own flesh, and so dies in a little while of his own poison. In this way the road-runner gets rid of his enemy without exposing itself to danger, provided the snake does not wake up before the cactus hedge is finished.—*Science Series.*

Wood Pewee.

(*Contopus vireus*).

BY "CHICKADEE."

A pair of these quaint little birds came to a dead cherry tree in my yard about the 15th of June, 1886. In a short time they built a nest, composed of lichens and bark, lined with horse hair, fine grass and small bits of wool, in an apple tree close by. The outside diameter was $2\frac{3}{4}$ inches, the inside $2\frac{1}{4}$ inches, and was $\frac{2}{3}$ inches in depth. The bottom was so thin that the eggs could be seen from below as the nest

rested on a forked twig. The birds completed their clutch on the 29th of June with three eggs, of which I have one fine specimen. They did not seem to miss the egg, and in about two weeks they had two downy young birds to care for. Had I left the third egg I hardly know where they would have kept the young bird, as the two completely filled the nest. They soon learned to fly, and left nearly as soon as they knew how, but the parents lingered until after the first snow storm (Nov. 7.), when they left for their sunny home in the South, thus making a stay of nearly five months.

The Stone Age in New York.

There is one peculiarity in the Indian relics of New York that impresses the general collector at once, east, west and south of central and western New York grooved axes are abundant. In the ancient territory of the Iroquois, they are scarcely ever found; perhaps never on village sites. I have examined a great many of their sites, some of which would be assigned to other nations, and the absence of this implement is everywhere conspicuous. It seems to be an Algonquin implement, never used by the Iroquois, or by their kindred.

This is a general feature of the sites from Albany to the Genesee river, and probably to Lake Erie, and seems to prove that all the early inhabitants were of the same general stock. Some used soapstone vessels, but not brown pottery. Others used brown pottery but not soapstone, the two never occurring together. Some had drills and scrapers in abundance; others lacked these entirely. I never have found

them in enclosures. Other distinctions might be mentioned which serve for classification.

The frequency with which bird totin-es and stone tubes are found, is a matter of interest, but these and copper implements seldom appear on village sites. If used, they were seldom lost on the spot. The perforated gorgets are more frequent in such places, and are of a great variety of forms and material. On the distinctly Iroquois sites articles of bone and horn are oftner met with than on the earlier ones, where for some reason they are comparatively rare.

It is a curious fact that shell beads are not found here on pre-historic sites, showing that the early inhabitants had not reached the seashore, or conquered any of its inhabitants. On the other hand the polished slate arrows, or rather arrow shaped knives, are quite local in their use.

Other things might be mentioned to draw the distinct position that this region occupies in the archaeological field, as unique in many ways as the Iroquois nation were among the surrounding Algonquins. Here have been found the only barbed fish hooks of bone or horn, and many other articles are as rare. It is fortunate that the field is now being thoroughly worked, with excellent results.—W. M. BEAUCHAMP in *Hoosier Mineralogist and Archaeologist*.

Mr. H. M. Downs, of Rutland, Vt., has our thanks for a copy of his "Field Notes on North American Birds." This is a neat little book of one hundred blank pages, to be carried in the pocket, and is very convenient to take notes on when in the field. Price only 30 cents.

Some Peculiar Indian Arrowheads.

BY W. K. MOOREHEAD, CINCINNATI, OHIO.

Most all of our archaeologists are inclined to keep the specimens having the finest shapes and showing the best of workmanship and let others, though rather rough but still of much more real value, pass by unnoticed. This is especially true of all who are much interested in collecting arrow points. Perhaps there is no kind of relic of the Indians left us that show as many changes and varieties of manufacture as does the arrowhead. I always like to get about two or three hundred of them and spend some time in sorting them over, for I always find so many peculiar ones. The most peculiar, and perhaps the roughest of them all, is found near large streams and ponds. These were undoubtedly used to shoot mink and musk rats. The Indian did not wish to spoil the hide of the game, and, therefore, generally shot it through the head. To do this (for the skull of mink and rats are quite thick) he would want his arrow tipped with a point that was rather heavy as well as strong, and he made one that suits the purpose exactly. This point has a broad top and well defined "flukes" or "barbs" so that it might be firmly fastened to the shaft; just below the flukes it narrows and also thickens in proportion, and when the point is reached there is a scale of flint neatly removed from all sides, leaving the point perfectly round. Then when shot into the skull of the game it would not flake off or break, as might the point of a common flat arrowhead. Among many collections of arrowheads I have seen. I have noticed but a few of these points.

Another very neat and interesting arrowhead, found throughout Ohio and the West, is the barbed war-point. We have always been lead to believe that war points were not barbed, and were made expressly to become detached from the shaft when shot into a person, thus causing a slow and tortuous death. You will find many broad and rather serrated heads with very prominent notches or barbs, which were surely used in war. Of course they would not become easily detached from the shaft, but the barbs being so large, the arrowhead could not be withdrawn without tearing a great gash, and if shot into a person very deep, it would be impossible to withdraw it, the muscles closing around the top and holding it as if in a vice. It is the same principle that makes a fish hook so hard to withdraw when once in your finger.

Besides these two kinds of war arrowheads there are some which seem to have been used in war as well as in hunting. Take, for example, the numerous arrow and spear points found in the old fort at Fort Ancient. Most of them are either without barbs or have very prominent ones; there are none that one might class intermediate. This goes to prove that both were used in battle, and the triangular ones being the lighter, were undoubtedly used on light arrows and shot from light weight bows; while the great barbed and heavier ones were used by the mighty warriors, and discharged by giant arms from powerful bows. Before going further I would like to state the reason I bring up these Fort Ancient arrowheads as examples and why I state that there are so many war implements found there is because the southern

slopes of the hills are literally full of decayed Indian bones. Thousands of decayed skulls and bones have been ploughed up in the vicinity of that fort, hence I conclude, as do many archaeologists, that there has been a great fight waged there; the fort itself explains that.

But to return to the new kinds of arrowheads. There are, as was said, more than two kinds of war points. There is a war point found in Fort Ancient that has straight sides and then a drop of a sharp angle to a point. This kind is rare. There is found in the southern part of this state [Ohio] an arrowhead, evidently made to be used in war, which is very long and slender and is sometimes taken for a drill.

Perhaps one of the rarest and prettiest of all the flint implements we find is the curved fish spear. It is seldom found less than three inches in length, and generally four inches or over. Some times the under side is perfectly smooth, all the chipping and work having been done on the outside, while in others it is chipped on both sides, and in all of them there is quite a perceptible curve. I have been told by a number of collectors that these spears were fastened to a short stick. The Indian, by long practice, would become so perfect in the handling and throwing of this spear that he could stand on the bank of a stream and seeing a large fish far out, say a hundred feet from shore, throw his spear down into the water before him and so direct it that it would describe a curve and rise under the fish, striking it on the stomach. I was inclined to laugh at this theory, but after some practice with one of these curved spears I found that I could throw it with quite a little accuracy, and then I believed the statement.

The top-barbed arrowhead is rather a peculiar form. What a barb was put on the top of an arrowhead, otherwise than to hold it when lashed to the shaft and from slipping backwards when striking an object, I could never find out. The most complicated and curious arrowhead I have seen had a deep notch or barb in the top, notches or barbs in the sides, and a long fine point. It was indeed a curiosity.

Birds of Green County, Pennsylvania.

BY J. W. JACOBS, WAYNESBURG, PA.

Continued from No. 4, Vol. II.

41.—*Parus atricapillus*, Black-capped Chickadee. Resident and abundant; breeds.

51.—*Sitta carolinensis*, White-bellied Nuthatch. Resident; breeds.

63.—*Troglodytes aedon*, House Wren. Common. summer resident; breeds. Arrives in April, and occasionally wintering.

74.—*Mniotilta varia*, Black-and-white Creeper. Migrant. Common in spring and fall.

93.—*Dendroeca aestiva*, Summer Yellowbird. Abundant summer resident; breeds. Arrives in April and departs in September.

99.—*Dendroeca pennsylvanica*, Chestnut-sided Warbler. Summer resident; breeds. Arrives early in May and departs in September.

117.—*Sirus motacilla*, Large-billed Water thrush. Rare summer resident; breeds. A set of five eggs were taken in May, 1886, when the birds immediately built another nest and reared a brood of six.

122.—*Geothlypis trichas*, Maryland

Yellow-throat. Summer resident; breeds. Arrives in May and departs in September.

123.—*Icteria virens*, Yellow-breasted Chat. Very common summer resident; breeds. Arrives in April and departs in September.

128.—*Scothaga ruticilla*, American Redstart. Summer resident; breeds. Arrives last of April and departs last of September.

135.—*Vireosylva olivacea*, Red-eyed Vireo. Common summer resident; breeds.

139.—*Vireosylva gilva*, Warbling Vireo. Common summer resident; breeds. Arrives in May and departs in September.

149.—*Lanius ludovicianus*, Loggerhead Shrike. Occasionally seen. No record of its breeding in the county.

151.—*Ampelis cedrorum*, Cedar Waxwing. Common resident; breeds.

152.—*Progne subis*, Purple Martin. Common summer resident. Formerly very abundant, but its numbers have lessened since the introduction of the English Sparrow. Arrives in April and departs in August.

153.—*Petrochelidon lunifrons*, Cliff Swallow. Very abundant summer resident; breeds. Arrives in April and departs in September.

154.—*Hirundo erythrogastra*, Barn Swallow. Very abundant summer resident; breeds. Arrives in April and departs in September.

157.—*Cotile riparia*, Bank Swallow. Common summer resident; breeds. Arrives in April and departs in September.

158.—*Stelgidopteryx serripennis*, Rough winged Swallow. Rare summer resident; breeds. Found a nest in May, 1886. It was placed in a crevice of a

stone abutment, about four and a half feet from the water. Could not get the eggs.

161.—*Pyrranga rubra*, Scarlet Tanager. Common summer resident; breeds. Arrives last of April and departs in September.

To be continued.

The Study of Birds.

Odd hours may be well spent in watching and studying the habits of birds, especially the most common ones. It may be thought by most persons that there is nothing new to be learned about birds so well known as the chipping sparrow or barn swallow, but many an interesting fact can be picked up by anyone giving a little time to their study. Now some city person will say, what can a person learn about birds in a city? I have lived in the city some years, and the bulk of my study of birds and their habits have come while in the city. Among the birds I have noted as being common are the Robin, Catbird, Bluebird, Barn and Cliff Swallows, Phoebe, Kingbird, Nighthawk, Baltimore Oriole, Red-and-buff-shouldered Blackbird, Cowbird, Crow, House Wren, Song Sparrow, Chipping Sparrow, Black Snowbird, Meadow Lark, Brown Creeper and Hummingbirds. Many more, both common and rare, are seen in the course of a season.

All but four or five of the birds I have named nest inside of the city limits, some of them in our door yards.

While birds have habits common to all the individuals of a species, they have also individual traits or peculiarities, that are interesting and show some degree of reasoning power. The study of general anatomy could be prof-

itably carried on with the study of habits.

Don't think, however, that habits and formation are all there is to be studied. When you have a good collection of notes at your disposal, you are just ready to begin another branch of study, that of collecting and examining the evidences of reasoning power you have collected.

Gather together all the parallel cases and form your theory. Then, ever after be on the watch for facts to sustain it. A few week's experience will point out more suggestions than could be easily enumerated. Let us now look to the means of study. A gun is very necessary for field work, but is generally out of the question in cities. The best substitute is a field glass. You can always remember a bird seen clearly through a field glass, and you will notice many odd ways that would have been lost had the bird been shot. After you have all the points of color and particular marking, etc., with the aid of a good text book, you can determine the species.

To a beginner, birds so near alike as the Downy and Hairy Woodpeckers, might cause some trouble, but in time birds can be distinguished at first sight. In studying color try and be in such a position as to give the bird or object a dark back ground. In closing, I would say, always keep a record of the notes you take from day to day. Don't omit a thing because you have noted it before, but always put it down.—*Young Oologist.*

We would like our readers to contribute a little more freely to these columns, especially articles on ornithology or entomology.

How Woodcock Woo.

Woodcock have certain peculiarities which endear them to the sportsman, as well as making them an interesting study to men of science. Their love-making is essentially their own. Early in the spring the male bird, seeking a mate, repairs to some well-known covert where the females congregate. It is just at sunset. All day long he has been industriously filling himself full of long, luscious worms, and as night-fall comes his bird thoughts turns to affairs more sentimental. When he reaches the parade ground he looks anxiously around, and if no suspicious noise jars on his sensitive ears he begins with a low, introductory overture. Then he grows impatient and utters loud, guttural bleatings, clucking just before each one. Then he struts up and down the mossy bank as if his performance gave him intense satisfaction. Then he considers himself fairly introduced, and taking wing, rises in the air, flying up in spiral circles, each growing smaller as he ascends. During this flight he utters a low, sweet, cooing note. After sailing about in a series of aerial somersaults he swoops down to the spot of his starting. For hours he fools about, displaying his wing performances, until at last the female can no longer resist his antics, and throwing coquetry, as Hamlet did the physie, to the dogs, she approaches with ruffled feather and dishevelled plumage. The two then meet and caress each other with every evidence of affection and all the by-plays of love thrown in, and locking their long bills in each others grasp, as if too happy for earth, they rise straight in the air and fly far out of sight in the darkness.

The Sparrow and the Bobolink.

BAD WORDS FOR THE ENGLISH IMPORTATION AND THE RICE EATER.

The material is largely in hand in the newly organized division of economic ornithology of the Department of Agriculture for a series of bulletins upon the relation of several common species of birds of this country to agriculture. The evidence collected will have a strong tendency in some cases to upset widely prevalent notions respecting the habits and value of certain birds, and, in others, to lead to organized efforts for the migration or extinction of pests which threaten destruction to certain branches of agriculture. In the later category Dr. C. H. Merriam, the head of the division, place the English sparrow as chief. This bird was imported with a flourish some years ago as an agent for the protection of shade trees from the ravages of caterpillars, inch worms and other creeping things, and has so multiplied and developed among its new surroundings as to become, Dr. Merriam thinks, a vastly greater scourge than the one it was expected to counteract.

Its present rate of increase is enormous, and the new territory which it invades is estimated at more than one hundred and thirty thousand square miles annually. It is essentially a town bird, nesting almost exclusively about and upon the projections of buildings, but it takes long vacations during the fruit growing seasons and wreaks its fastidious appetite upon the largest and juiciest of grapes and the daintiest of tree fruits, in which work of destruction its aggregate of damage is almost incomputable. How best to prevent its further increase and curtail its ravag-

ing propensities is an unsolved problem. It may be shot or poisoned, or it may be despoiled of its nest, but neither plan promises permanent relief. It is a wary and suspicious creature, readily learning to avoid places where any of its fellows met their fate, while, as if in anticipation of future necessities, it has, within the last year or two, begun to practise the art of nest building in trees. It is, as yet, the most lubberly of winged architects, carrying great heaps of unassimilable rubbish to its building place, where it makes a huge, shapeless structure, upon the top of which it sets up housekeeping. Oftener than otherwise the first high wind brings the mass to the ground and works the destruction of all its domestic arrangements.

The bobolink of the North, the rice bird of the South, has been receiving much close attention from the ornithologist and his correspondents. This cheerful little creature is found to be rather helpful to the Northern grain growers, an examination of its maw discloses the fact that it does not care for the growing grain, but lives upon the seeds of destructive weeds and upon equally destructive field insects. But it so times its annual migration as to pass about three weeks in the rice fields of the South at the season when that grain is in the milky state, and there its ravages are enormous. The estimated annual loss to the rice planters from the depredations of this bird is between \$3,000,000 and \$4,000,000. Dr. Merriam recently spent some time in the rice fields of South Carolina for the purpose of studying the habits of the bird and of experimenting with a view to preventing its depredations. He found the planters making their usual heroic efforts, and with their us-

nal partial success, to save their crops. For illustration, a field of two hundred acres required the employment of more than fifty men and boys, their duty being for some hours, morning and evening to create such a hubbub with guns and other noise-producing implements as would prevent the birds from settling upon this particular field, and scare them over to those of their neighbors, where a similar din was in progress for a like purpose. Dr. Merriam caused a number of stuffed hawks, with wings outspread, to be suspended by strings from tall poles, so as to sway with the breeze over the fields. This device proved a safeguard for only two or three days, by which time the bobolinks had mastered the trick, and thereafter they treated the dummies with contempt. However, one day while the effigies were still swinging and after the robbers had again settled down to their work, Dr. Merriam noticed a single live hawk, high up, sailing over the flats. The bobolinks rose in great clouds and remained in the air until the perial was passed, although the hawk apparently paid no attention to them.

Dr. Merriam thinks that a single hawk, trained as were the falcons with which the sportsmen of the Middle Ages amused themselves, would be an effective protection to a rice field of 200 acres. It is probable that an experiment in this direction will be tried, if a person of sufficient experience in the training of birds can be found to undertake it.

With regard to our indigenous birds of prey—the hawks and the owls—for the killing of which Pennsylvania and, perhaps, other States pay a premium, Dr. Merriam says ornithologists are

quite positively convinced that their services are of great value to farmers. Not more than three out of upwards of thirty species prey upon domestic fowl, and even these more than remunerate the farmer by killing field mice, grasshoppers, beetles and other vermin which are great destroyers of grain.

The crow has received considerable attention from the Doctor and his correspondents, but the evidence in hand is not sufficient to warrant a verdict. So far as it goes it creates impressions in his favor. He is a corn thief, to be sure, but his pilferings may be guarded against; while on the other hand he destroys some kinds of field vermin in great numbers, to say nothing of his work as a scavenger.

Dr. Merriam is the secretary of the American Ornithologists' Union, by whose suggestions Commissioner Colman was largely guided in organizing the work of the new division.

—Contributed by PH. HEINSBERGER, of New York.

Platinum.

BY DR. B. F. MASON, SAN LEANDRO, CAL.

Platinum was first discovered in the year 1735, in small grains in the alluvial deposits of the Pinto river, in the district of Choco, near Popayan, in South America, where it received the name of platina, derived from the Spanish word *plata*, meaning silver.

Platinum is usually found in small flattened or angular grains, though its crystalline form—which is rare—is in cubes or octahedrons. It is of a steel-gray color, with a metallic lustre and without cleavage. It is malleable, ductile with a hardness similar to that

of copper, and a specific gravity varying from 16, impure grains, to 21-15, cast platinum. It is, therefore, the heaviest metal in the world, unless it be osmium. Like gold it is obtained by washing away the earth and sand with which it is associated. It is found in combination with the rare metals, iridium, rhodium, palladium and osmium, besides copper and iron, which increases its hardness and gives it a darker color. An analysis of a Russian specimen afforded, platinum, 78.9; iridium, 5.0; osmium and iridium, 1.9; rhodium, 0.9; palladium, 0.3; copper, 0.7; iron, 11.0, 98.75.

Platinum is distinguished by the following characteristics: Its high specific gravity, its malleability, its insolubility in any single acid, and its extreme infusibility, being wholly unaltered before the blowpipe. The following is an accurate chemical test: Dissolve the crude metal, as far as possible, in nitro-muriatic acid containing an excess of hydrochloric acid, slightly diluted with water, in order to dissolve as small a quantity of iridium as possible; to this deep yellowish-red solution add chloride of ammonium, when an orange precipitate is thrown down, in the state of ammonium plantinocl chloride. This substance, if washed with a little cold water, dried and heated to a redness, leaves metallic platinum in a black powder, or, as it is called, "spongy platinum." It can be formed in a compact mass by making the spongy platinum into a thin uniform paste in a brass or steel mold, and then subjecting it to gradual pressure by which the water is squeezed out and the mass finally rendered sufficiently solid to bear handling. It is then dried and carefully heated to

whiteness, when it can at last be forged into a bar.

Since the discovery of platinum in the alluvial workings of the Pinto river it has been found in the Ural Mountains in Russia; on the island of Borneo, in the sands of the river Rhine; in St. Domingo; and in the United States in North Carolina, California, Oregon and Arizona. The most important sources of platinum are the hydraulic mines of Nizhne-Tagihlsk, in the Ural Mountains, where it is found with chromite in serpentine. Nearly eighty per cent. of the world's production of the metal is derived from this source. Platinum in considerable quantity is found with the gold washed from the Atrai river in the United States of Columbia, from where it is sent to Paris. In Brazil platinum is obtained in the province of Minas Geraes near syenite. It has also been discovered in Hayti, Peru, India, County of Wicklow in Ireland, Australia, and in the Chaudiere river in Quebec.

Though commonly found in small grains, masses of platinum have occasionally been discovered. The largest nugget yet found weighed twenty-one pounds, and is in the Demidoff cabinet in Russia. Humboldt brought from South America a mass weighing 1088 grains, which he deposited in the Berlin Museum. In the Madrid Museum is a mass weighing 11,640 grains, found in Condoto in 1822. In 1827 a specimen was discovered in the Ural Mountains, near the Demidoff mines, which weighed 11.57 pounds troy.

Until recently, platinum has always been found in placer or alluvial deposits; but a few years since a discovery was made of great interest to mineralogists and geologists. In deepening the

shaft of the "Queen of Beauty" gold mine, in the Thames gold district, in New Zealand, platinum was found in a quartz vein, impregnated with auriferous pyrites.

In California, as early as 1858, miners finding small quantities of platinum in their sluices were induced to collect and save it, under the impression that it was worth more than gold. Thus during several years of placer mining in that state, three or four hundred ounces of platinum sand, mixed with its associate minerals, were annually sold in San Francisco; but of late years, with the decrease of hydraulic mining in California, the amount of platinum produced has been reduced to one hundred and fifty ounces per annum. In California platinum has been found near Trinity Centre, Trinity county; at Hopland, Mendocino county; at Gold Bluff, Humboldt county; in the Spring Valley Hydraulic Mines, Butte county; in Plumas, Sierra, Mariposa, Del Norte and Toulumue counties. On the north fork of the Trinity river, platinum occurs in large grains and nuggets, the largest specimen found weighing between two and three ounces.

Though platinum cannot be fused by the ordinary furnace or common blowpipe, it readily melts before the compound or oxyhydrogen blowpipe. An advantage is taken of this in refining platinum by the following process: It consists of submitting the crude metal to the action of an intensely high temperature in a crucible of lime. The lower part of the furnace consists of a piece of lime hollowed out in the centre, while a small notch is filed at one side of the basin, through which the metal is introduced and poured out. A lime cover also fits on top of this basin, it is also slightly hollowed and has a conical perforation at the top, into which is inserted the nozzle of the oxyhydrogen blowpipe. The whole is

firmly bound with iron wire. Then the stopcock supplying hydrogen is opened and the gas lighted at the notch in the crucible, the oxygen is then gradually supplied, and when the furnace is sufficiently hot the metal is introduced in small pieces through the opening. By this means fifty pounds and more of platinum may be fused at once. In this operation all the impurities are separated from the platinum except the iridium and rhodium. The gold and palladium are volatilized; sulphur, phosphorus, arsenic, and osmium are oxidized and volatilized; and the iron and copper oxidized and absorbed by the lime of the crucible.

The production of platinum in the United States in 1883 was 220 ounces, and in 1884, 175 ounces. The value of the metal is steadily increasing; in 1883 the importer's price was \$6.50 per troy ounce, and 3,104 pounds were imported into the U. S., and in 1884 the importer's price was from \$7.50 to \$8.50, and 2,846 pounds were imported.

Platinum is quite extensively used in the arts and sciences. It is largely employed in the manufacture of chemical apparatus, such as crucibles, evaporating dishes, retorts, combustion beats, blowpipe nibs, funnels, spatulas, foil and wire. Platinum vessels are used in sulphuric acid manufactories, where care is taken to produce an acid containing no nitric acid. Platinum is also used quite extensively in the manufacture of instruments of precision, such as standard weights and measures.

Platinum was coined in Russia from 1826 to 1844, during which period 4,146,504 rubles were coined, but as their coinage became unpopular it was discontinued and the rubles redeemed by the government in 1845.

Platinum is also used in the manufacture of surgical instruments, pins for artificial teeth, for filling teeth, for tips of lightning rods, for porcelain painting, and recently its use for incandescent electric lights and also in gas jets have caused an increase in the demand for the metal and consequently an increase in its value.

CORRESPONDENCE.

HILEZA, 21st November, 1886.

CHARLES P. GUELFE, Esq.

Dear Sir:—

By a notice published in "Physical Scientific Journal," in Italy, a certain Mr. G. H. Berry, Livermore, Me., offered to exchange American coleoptera and lepidoptera for such of Europe. I had correspondence with him, and he wrote me to send a large collection of the said specimens. I forwarded, therefore, 500 fine butterflies packed in copping and a box face Livermore. Their value amounts to \$60 and I paid \$2 postage. I have not received any notice from the said gentleman in reference to my sending, and all my letters remained unanswered. I wrote, therefore, during the last spring, to my friend Mr. Seebach, of Peru, Ill., and the said friend took the matter in hand in an energetic manner. Berry answered that he was not able to send me anything the last year, as all his collections were wasted, but that he would send me then 550 pieces instead of 500 as I sent. But till to-day I am awaiting the sending or any reply to my various letters. You will very much oblige me when you will have the kindness to let me know your opinion what I should do for recovering my specimens or my \$62. * * * * *

Please favor me by an answer, and believe me, dear sir,

Very respectfully yours,

AD. HOŁECZEK, Naturalist,

Hileza, pr Dawideny,
Bucowina, Austria.

We would like to hear from Mr. Berry in relation to the above.—ED.

Having received from collectors and others interrogations relating to the sulphur diamond, I take the privilege of answering through the columns of your journal. The sulphur diamond is only pyrites, and is of no great value. It is found in the anthracite coal region in the mines, and when first procured it is very soft and fragile, but when exposed to the atmosphere for several hours it becomes as hard as flint. Of late years it has been purchased by jewelers for settings in rings, pins, etc., and at the present

writing specimens are very rare. I have some very beautiful specimens on hand and would not part with them for a good deal.

GEO. W. JOHN, Shamokin, Pa.

Recently while sitting at my window cleaning my magnifying glass I discovered a wasp which on inspection I found had two heads. I tried to capture it but failed. FRANK BOLL, Rochester, N. Y.

EXCHANGES.

THIS column is open to all subscribers, who may insert exchanges free of charge. NO advertisements admitted to this column under any circumstances, and we shall reserve the right to insert no exchanges which are merely intended to secure cash purchasers.—Ed.

W. R. LIGHTON, Leavenworth, Kansas.—A bronze coin of Morocco, six hundred years old, obtained direct from a correspondent in Syria, for minerals, fossil coral, or Indian and Mound Builders' relics.

Box 435, Sharon, Wisc.—Prize Holly scroll saw and minerals for birds' eggs in complete sets with full data. Nests desired when possible.

W. W. PHILLIPS, Clark, Penn.—I have a complete set of Wilson's American Ornithology, in four volumes, fine cloth binding, and in very good condition. Price, when new, \$16. Will exchange for books, eggs or minerals.

JOSEPH ANDERSON, Muskegon, Mich.—To every one sending me a geological specimen or sea-shell I will send a paper over 50 years old. The first 15 will receive rare curiosities.

GEO. W. JOHN, Box 533, Shamokin, Pa.—Slate rock with impressions of ferns thereon for minerals not in my collection. Write what you have to exchange.

J. R. Nissley, Ada, O.—"Coins and Coinage," new, 100 pages and over 100 illustrations, to exchange for Indian relics, minerals or marine specimens.

QUERIES AND ANSWERS.

To C. D. O., Waco, Texas.

The bird described in the last issue is undoubtedly a female Towhee Bunting.

F. C. LUSK, Holley, N. Y.

H. C. O., Waterloo, N. Y.—The specimens sent for identification are as follows: 1 and 2, corals; 3, skate or sand shark egg; 4 and 5, unknown to us; 6 agate; 7, believe it to be the same.

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